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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1991

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

ON

H.R. 5019

AN ACT MAKING APPROPRIATIONS FOR ENERGY AND WATER DEVELOPMENT FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1991, AND FOR OTHER PURPOSES

PART 1 (Pages 1-534)

DEPARTMENT OF THE ARMY
Corps of Engineers—Civil
DEPARTMENT OF ENERGY
TENNESSEE VALLEY AUTHORITY

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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1991

WEDNESDAY, MARCH 21, 1990

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2 p.m., in room SD-192, Dirksen Senate Office Building, Hon. J. Bennett Johnston (chairman) presiding.

Present: Senators Johnston, Hatfield, McClure, and Domenici.

DEPARTMENT OF ENERGY

OFFICE OF ENERGY RESEARCH

STATEMENT OF DR. JAMES F. DECKER, ACTING DIRECTOR, OFFICE OF ENERGY RESEARCH, DEPARTMENT OF ENERGY

OPENING STATEMENT

Senator JOHNSTON. The subcommittee will come to order.

This afternoon we will hear the fiscal year 1991 budget request of the Office of Energy Research, which is one of the largest basic research activities in the Federal Government with total funding in the current year of about $2.4 billion. The fiscal year 1991 request for appropriations is for $2.7 billion, an increase of over $300 million.

We are pleased to welcome Dr. James F. Decker, Acting Director of Energy Research in the Department of Energy. Dr. Decker is also the Deputy Director and I believed he served as Acting Director several years ago.

PREPARED STATEMENT

Dr. Decker, we look forward to hearing your presentation today, especially your request for the high energy physics program, the superconducting super collider, nuclear physics, basic energy sciences, magnetic fusion, global warming, climate change; human genome project as well as other very interesting important programs. Your full written statement will be incorporated in the record and we would like to hear your summary of each of these programs. Please proceed.

STATEMENT OF JAMES F. DECKER

Mr. Chairman and Members of the Subcommittee:

It is a pleasure to appear here today to present the FY 1991 budget request for the programs supported by the Office of Energy Research (ER). These programs are: High Energy Physics, the Superconducting Super Collider, Nuclear Physics, Basic Energy Sciences, Magnetic Fusion Energy, Biological and Environmental Research, Energy Research Analyses, University and Science Education, University Research Instrumentation, Multiprogram Energy Laboratories-Facilities Support, and supporting program direction.

Funding for these programs in FY 1991 is being requested under the two appropriations shown in Table 1, Energy Supply R&D and General Science and Research. The total FY 1991 budget request for ER's programs is $2.7 billion, an increase of $302 million over the FY 1990 appropriation of $2.4 billion. In his February 7, 1990, testimony before the House Committee on Science, Space, and Technology, Dr. Allan Bromley, Director of the Office of Science and Technology Policy, noted that, "federal support for basic research is an essential investment in the nation's scientific and technological future." This request reflects the Administration's commitment to the key role played by science in enhancing the economic and technological well-being of the United States, as well as the quality of our lives. It also reflects our continuing commitment to excellence in the research programs supported by the Office of Energy Research. I would like to discuss the programs under the General Science and Research appropriation first, followed by those under the Energy Supply R&D appropriation.

Table 1
Office of Energy Research
Summary by Program
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Energy Supply R&D			
Basic Energy Sciences	$ 534.3	$ 569.8	$ 648.7
Magnetic Fusion Energy	344.7	320.3	325.3
Biological & Environmental Research	250.8	308.7	338.8
Energy Research Analyses	3.8	3.8	3.7
University and Science Education	21.4	24.9	3.7
University Research Instrumentation	4.9	4.9	29.7
Multiprogram Energy Laboratories-Facilities Support	4.9		4.9
Advisory & Oversight Program Direction	24.4	22.1	23.7
Policy and Management	3.3	3.3	4.3
Small Business Innovation Research	.7	.7	.9
	33.1	0	0
Subtotal	$1,221.4	$1,258.5	$1,380.0
General Science & Research			
High Energy Physics	$ 549.8	$ 582.1	$ 621.2
Superconducting Super Collider	98.1	218.6	317.9
Nuclear Physics	258.0	289.7	330.7
General Science Program Direction	2.6	3.0	3.9
Subtotal	$ 908.5	$1,093.4	$1,273.7
Total ER	$2,129.9	$2,351.9	$2,653.7

HIGH ENERGY PHYSICS

The long-standing goal of the High Energy Physics program is to improve our understanding of the nature of matter and energy and of the basic forces that govern the world in which we live. One of the major objectives of high energy physics research is to develop a unified description, or single theory, that would describe all the interactions of matter and energy in the universe. Another major objective is to search for the most fundamental constituents of matter. To continue to expand our knowledge in these areas, the program must develop advanced technologies that are used in the accelerators and detectors required to carry out high energy physics research.

Over the years, the program has contributed significantly to the development of advanced technology in many areas critical to the United States' economy, such as large-scale computing, high-speed electronics, and low temperature superconductivity. The instruments of high energy physics research and the knowledge gained from this basic research program have found practical applications in our every day world: in medicine for diagnosis and treatment of illness, in the food industry for sterilization, in construction for inspection of structural defects, in law enforcement for the analysis of evidence, in computers and computer science, and in the making of computer chips.

In recent years, high energy physicists have developed an increasingly better understanding of the forces of nature and the unifying connections among them. The four known fundamental forces are the electromagnetic force, the weak force, the strong force, and the gravitational force. The search for a unified, or single, theory has been a reliable guide to physics research. It is a search for linkages between apparently diverse phenomena in an effort to discover underlying simplicity. A part of the progress in high energy physics has been the conceptual unification of the weak nuclear force and electromagnetic force into a single "electroweak" framework. In addition, a theory of the strong force has emerged which is consistent with experimental results. There is increasing anticipation that the unification of the strong nuclear and the electroweak forces into one "grand unified" framework may be possible, thus reducing the apparent number of forces in nature to two. The ultimate goal is a "super-grand" unification that would bring all of the forces in nature into a single unified framework.

This picture of nature in terms of the electroweak and strong forces and a small set of fundamental constituents of all matter is known as the Standard Model. While the most significant recent experimental results all reinforce the predictions of the Standard Model, there are still unanswered fundamental questions. For instance, have we discovered the ultimate constituents of matter or are there smaller particles inside the families of particles called "leptons" and "quarks" which we currently believe are the fundamental particles? Do we know all the forces of nature? Are all these forces only a manifestation of a single force? How does gravity fit into the Standard Model?

The ability to carry out forefront, exploratory research in High Energy Physics, and to pursue the answers to these questions, requires large particle accelerators, colliding beam devices, and large particle detectors. In the U.S., DOE supports three accelerator centers: the Fermi National Accelerator Laboratory (Fermilab), the Stanford Linear Accelerator Center (SLAC), and the Alternating Gradient Synchrotron (AGS) at Brookhaven National Laboratory (BNL). Each of these laboratories provides world-unique capabilities and is operated as a national facility available to qualified experimenters from around the world on the basis of the scientific merits of their proposals. The talented physicists attracted by these facilities have continued to conduct landmark research, some of it earning Nobel Prizes for the researchers. To push back the frontiers to new knowledge in this field and to maintain this pioneering program into the next century, construction of the Superconducting Super Collider (SSC) is necessary. The SSC, which will be discussed later in this statement, will be the largest scientific instrument ever built and will be a beacon for new discovery, scientific training for our youth, and a source of new technology for many decades.

The physicists who are planning and developing experiments to be conducted at the SSC will continue to be funded under the High Energy Physics program as has been the past practice for other accelerators. Similarly, most of those who will conduct research at the SSC will come from the university community, as is the case at the existing accelerators. More than 75 percent of the research done at U.S. High Energy Physics accelerator facilities is carried out by university-based scientists and graduate students. Their participation is critical to the strength and vitality of the U.S. program, both in the production of research results and in the training not only of new physicists, but also of scientists and engineers in other disciplines.

Before turning to a discussion of the FY 1991 budget request, I would like to summarize some of the recent progress made by the university and laboratory scientists working at the three High Energy Physics accelerator facilities. The capabilities of the Tevatron at Fermilab allow scientists to observe a larger number of particle interactions than at any other facility in the world. Scientists there are searching for an as yet unobserved, but theorized, particle known as the "top quark" whose existence, if verified, would confirm predictions of the Standard Model. Based on analysis of the results of experiments run in 1989, Fermilab investigators have shown that the mass of the top quark must be greater than 78 billion electron volts (GeV). Thus, the search must continue through experiments at even higher energies which are available only at the Tevatron.

At SLAC, the recently completed Stanford Linear Collider (SLC) has demonstrated the concept of linear colliders. Using 50 GeV beams, SLC is providing crucial data on the feasibility of building a next generation of higher energy linear colliders to permit experimentation in a new energy region. The second goal of the SLC is to study the so-called Z^0 particle, believed to be the "carrier" of the weak nuclear force. Detailed study of this particle provides important tests of the Standard Model including a direct measurement of the number of generations of neutrinos, which are uncharged elementary particles. Thus far, scientists at the SLC have detected more than 500 Z° particles at 7 energy levels. Using these particles, scientists made the first precise measurement of the width and mass of the Z° and have determined with a high degree of probability that, in conformance with the Standard Model, there are three generations of neutrinos.

At Brookhaven National Laboratory, the Alternating Gradient Synchrotron's (AGS) extensive facilities provide yet another different test of the Standard Model by studying the way (or mode) in which particles called "kaons" decay. Some of these decay modes occur very infrequently and thus are called rare decay modes. Using improved detectors, recent physics results have reduced the upper limits on the rates of decay for these rare decay modes to as low as one in three billion ordinary decays. The Standard Model predicts that these rare decays will occur at a rate lower than one in three billion. Ongoing studies will continue to provide experimental results for comparison with the predictions of the Standard Model.

FY 1991 HIGH ENERGY PHYSICS BUDGET REQUEST

The FY 1991 budget request for High Energy Physics is $621.2 million. Of the total amount, $494.2 million is for Operating Expenses, $88.2 million is for Capital Equipment, and $38.8 million is for Construction. (Tables 2 and 3).

The Operating Expenses request of $494.2 million provides for the continued participation of both experimental and theoretical university scientists and students who are critical to the success of the High Energy Physics program, as well as for the operation of the High Energy Physics accelerators: the Stanford Linear Collider, the Tevatron accelerator/collider, and the AGS. The Tevatron will conclude a major fixed target run which will be followed immediately by an extensive antiproton-proton colliding beam run. The latter will involve two major detector facilities: the upgraded CDF (Collider Detector at Fermilab) detector and the complementary new D-Zero detector which is scheduled for completion and commissioning in the summer of 1991. With these capabilities, the physics utilization of the Tevatron collider will effectively be doubled from its previous run.

Table 2
General Science and Research
High Energy Physics
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Physics Research	$ 121.6	$ 131.1	$ 140.3
Facility Operations	246.4	260.2	278.7
High Energy Technology	62.9	71.6	75.2
Subtotal	$ 430.9	$ 462.9	$ 494.2
Capital Equipment	79.8	84.1	88.2
Construction	39.1	35.1	38.8
Total High Energy Physics	$ 549.8	$ 582.1	$ 621.2

Table 3
General Science and Research
High Energy Physics
Budget Authority
($ in millions)

Construction

Project	TEC	FY 1990	FY 1991 Request
AGS Accumulator/Booster (86-R-105)	31.7	4.9	0[1]
Fermilab Linac Upgrade (90-R-104)	22.8	4.6	12.0
Accelerator Improvements and Modifications	$ N/A	$ 13.9	$ 14.5
General Plant Projects (GP-E-103)	N/A	11.7	12.3
Total Construction		$ 35.1	$ 38.8

[1] Funding completed in FY 1990

Physics research at the SLC will emphasize use of the new polarized electron beam capability which will be commissioned during the year. This new capability has the same effect, for some measurements, as increasing the collision rate by a factor of 10. With this new polarized beam, the collision rate near the design level, and a new detector scheduled for completion late in 1990, we expect that the SLC will be at the leading edge of high energy physics research in FY 1991. The Positron-Electron Project will also be operated at SLAC utilizing the improved Time Projection Chamber detector.

The AGS will operate primarily for High Energy Physics rare kaon decay experiments. The new AGS Accumulator/Booster will be commissioned during FY 1991. It will improve the performance and capabilities of the AGS, in part by providing more intense beams, and will significantly increase the data collection rate for the experimental program.

The FY 1991 Operating Expenses request also includes funding to support long-range accelerator and detector R&D to develop the new concepts and technologies that are essential to the efficient operation, continued enhancement, and extension of accelerator and detector capabilities.

The FY 1991 Capital Equipment request of $88.2 million will provide the particle beam-line components, detection apparatus, and data analysis systems essential to forefront High Energy Physics research. In FY 1991, priority will be given to final completion of two major new collider detectors, one for SLC and one for the Tevatron, and to an upgrade of computer and data analysis equipment at universities participating in the program.

The FY 1991 Construction request of $38.8 million includes continued funding for the Fermilab Linac Upgrade project, a key element in maintaining a productive research program with the Fermilab Tevatron in the years before the SSC becomes operational. The Construction request includes $12.0 million for this $22.8 million project. The Linac Upgrade will replace a portion of the existing accelerator hardware for which commercial replacement parts are no longer available. This upgrade will increase the output energy of the linac from 200 to 400 million electron volts. The increased output energy will increase both the Tevatron collider collision rate and the beam intensity for the fixed target program, thus permitting additional experiments and increasing the likelihood of observing rarer occurrences such as the creation of the top quark. The Construction request also includes $14.5 million for Accelerator Improvements and Modifications (AIM) and $12.3 million for General Plant Projects (GPP). AIM projects provide for improvements to research accelerators and related experimental facilities, while GPP projects address the need to upgrade general laboratory facilities. These projects are needed to maintain the scientific effectiveness, reliability, and efficiency of High Energy Physics facilities.

SUPERCONDUCTING SUPER COLLIDER

Although scientists working in high energy physics have made great progress in understanding the basic structure of matter and the fundamental forces, many important questions remain unanswered. The SLC and Fermilab Tevatron, together with other High Energy Physics facilities, will keep the U.S. program competitive and at the forefront in the search for answers to these questions for the next several years. However, to push the frontiers of knowledge into the trillion electron volt (TeV) mass region, where new and exciting discoveries are anticipated, a new, more powerful particle accelerator, the Superconducting Super Collider, is required.

The SSC will allow physicists to continue along a path of research that has dramatically altered the way we live, though the consequences often are not apparent for many years. Man's first steps on the moon would have been impossible without the basic conceptual understanding of gravity developed centuries earlier by Galileo and Newton. Radio and television and all the other electronic wonders of our age rest on the understanding of electricity and magnetism developed during the last century by Faraday, Maxwell, and Hertz. Nuclear power and nuclear medicine can be traced to the quests in the first half of this century by Rutherford, Bohr, and Fermi for a deeper understanding of the atom and the nucleus. The positive impact on individual lives of the new knowledge gained through this research can be seen in many areas. In nuclear medicine, for instance, it has been estimated that several million Americans each year receive medical diagnosis or treatment from techniques which were developed from the technologies and particle accelerators used in basic physics research. Striking examples include computer-assisted tomography (CAT), positron emission tomography (PET), and magnetic resonance imaging (MRI).

The SSC will be the world's preeminent facility for high energy physics research into the next century. The SSC is a proton-proton collider with an energy of 20 TeV per beam whose principal feature is two rings of approximately 10,000 superconducting magnets located in an underground tunnel 54 miles in circumference. The two rings of magnets will steer and focus the proton beams in opposite directions until they are made to collide at the various interaction regions where large detectors record the events for analysis by physicists. The SSC will permit scientists to explore this new trillion electron volt domain of physics which cannot be reached by any other facility either in existence or planned.

The SSC is a critical part of the Administration's initiative to strengthen the position of the Nation as a world leader in science and technology. It will be a symbol of the Nation's commitment to scientific leadership in this century and the next. We can be confident that the SSC will yield exciting discoveries and technological innovations that will likely affect major industrial and technological directions in the twenty-first century.

This past year has been one of significant achievement. In January 1989, the Department announced the selection of the site for the SSC in Ellis County, Texas, and the selection of Universities Research Association, Inc., as the management and operating contractor to establish the SSC Laboratory and to design, construct and operate the SSC. An interim laboratory facility has been set up in leased space in DeSoto, Texas, near the Ellis County site. The Laboratory currently has approximately 500 people on board.

Also during the year, the SSC Laboratory developed and presented to the Department a preliminary, site-specific design for the SSC along with a revised cost estimate and schedule. Design changes proposed by the Laboratory include increasing injection energy into the collider from 1 TeV to 2 TeV, increasing the inner diameter of the superconducting dipole magnet coils from 4 centimeters to 5 centimeters, increasing the circumference of the ring by about one mile to accommodate stronger beam focusing, and providing larger detector halls. These changes result from additional technical information that has recently become available. Results of the Tevatron collider operations, supercomputer simulations of SSC-like proton orbits, and experience with magnets at the HERA facility in West Germany indicate that these changes are necessary. These changes will ensure that the SSC will operate reliably at the design parameters of energy and collision rate with a minimum of commissioning time.

These design changes and updated cost estimates are likely to raise the cost of the SSC from $1-2 billion. The Department is concerned about the cost rising above the previous $5.9 billion estimate and is committed to keeping the cost as low as possible. However, we want to be certain that the facility we build will meet the physics goals of the SSC and will operate productively soon after completion of construction. The Secretary has indicated that the Department supports the technical conclusions of a recent High Energy Physics Panel study that strongly reaffirmed that 20 TeV is the appropriate energy for the SSC. The Secretary also supports the proposed technical design changes. However, during the coming months, we will carefully review the new design and cost estimate and will develop a validated technical, cost, and schedule baseline for the SSC. This review, which will be carried out with assistance from outside technical consultants and the Department's Independent Cost Estimating Group, should be completed by about August 1990.

As the Committee is aware, the State of Texas has made a commitment to contribute approximately $1 billion towards the construction of the project. We have had a series of discussions with the State's representatives and we expect to reach agreement with them in 1990 on the scope and pattern of their contribution. We will also establish the so-called "footprint" for the facility that will enable Texas to identify the specific parcels of land required so that preparations for land acquisition can begin, and so that on-site activities needed to complete the Supplemental Environmental Impact Statement can be conducted. The SSC Laboratory has awarded a contract to the Lockheed Company to provide systems engineering and integration support. The Laboratory has also selected for contract negotiation an Architect-Engineer/Construction Management contractor to design and supervise construction of conventional facilities. In the near future, an industrial contractor will be selected competitively by the Laboratory to participate in finalizing the design of the superconducting collider dipole magnets, to develop a cost-effective and reliable manufacturing process, to fabricate prototype magnets and to demonstrate the production process by fabricating a significant number of magnets using final production tooling.

The major focus of the ongoing research and development program continues to be the superconducting dipole magnets. The R&D program conducted over the past few years on the original magnet design accomplished its objective of developing a main line magnet configuration which provided the basis for proceeding with engineering development and with establishment of the manufacturing process. The emphasis of the program will now shift to developing a design for the revised magnet specifications recently proposed by the Laboratory which call for increasing the inner diameter of the superconducting coil from 4 centimeters to 5 centimeters and reducing the length of most of the magnets from 17 meters to 15 meters. We expect to have the first short model (1 meter) of a new design magnet tested late in 1990 and the first full length (15 meter) magnet completed in 1991.

Another important activity during the last year was the preparation of a plan for seeking international contributions. The plan was developed in cooperation with the Office of Management and Budget, the Office of Science and Technology Policy, the National Security Council, the National Science Foundation, and the Commerce and State Departments, as well as with other appropriate agencies within the Executive Branch. The plan sets out our international objectives, the policy and regulatory framework in which we will conduct the international negotiations, and the strategy for establishing appropriate international agreements. Our proposed strategy builds upon the experience of the U.S. High Energy Physics program in international cooperation and the experiences of other major research laboratories in Europe and Japan. We recognize the need to apprise Congress of our international cost-sharing strategy but have postponed doing so pending our review of the preliminary site-specific design and cost estimates. We intend to brief Congress in the near future on the International Plan. We also recognize the need to notify Congress prior to entering into any final agreements on foreign contributions.

Foreign interest in the SSC was evident at an International Conference on Supercollider Physics and Experiments hosted by the SSC Laboratory in early October. About 20 percent of the approximately 600 participants were from overseas, thereby reflecting the considerable worldwide interest in the program. The SSC Laboratory has also organized several advisory committees, which include foreign scientists, to seek the best scientific advice in order to optimize the machine's design, and to conduct the most appropriate experimental research program consistent with available resources.

FY 1991 BUDGET REQUEST FOR SUPERCONDUCTING SUPER COLLIDER

The FY 1991 budget request for the Superconducting Super Collider (SSC) is $317.9 million. That request includes $116.0 million for Operating Expenses, including $5.7 million for Program Direction; $33.0 million for Capital Equipment; and $168.9 million for Construction. (Table 4).

Table 4
General Science and Research
Superconducting Super Collider (SSC)
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Research and Development	$ 81.6	$ 68.0	$ 110.3
Program Direction	0.5	0.9	5.7
Subtotal	82.1	68.9	116.0
Capital Equipment	16.0	20.7	33.0
Construction (90-R-106)	-	129.0	168.9
Total SSC	$ 98.1	$ 218.6	$ 317.9

The Operating Expenses request of $116.0 million provides for an enhanced level of R&D for the superconducting magnets and to support the transition to industrial fabrication of pre-production magnets which is planned for FY 1992. The request will allow substantial work on the conceptual design of other collider systems, including the focusing and correction magnets, cryogenics and the injector system. The request will also support a needed expansion in the detector subsystems R&D program.

The Capital Equipment request of $33.0 million will provide for prototypes in support of the R&D activities on the many accelerator components and systems of the collider and its four injector accelerators, such as power supplies and test and control instrumentation. The request also provides for components for the magnet test facility. Further equipment funds will also be used for prototypes of detector subsystems and components as SSC experiments and detectors become more completely defined, as well as for general laboratory and computer equipment essential for establishing a new research laboratory.

The FY 1991 Construction request of $168.9 million will allow construction-related activities to proceed in a number of areas, including detailed design of technical systems and conventional facilities, industrialization of magnets, procurement of materials for the magnet prototypes, initial fabrication of injector system components, site preparation, and project management and support. No tunneling construction is expected to occur until a decision has been made to go to commercial production of the superconducting magnets.

The FY 1991 budget request for SSC Program Direction is $5.7 million. The requested funds are required to provide for the salaries, benefits, travel and other expenses associated with 52 full-time equivalent employees for the Office of Superconducting Super Collider, both at Headquarters and at the SSC on-site Project Office. The new management organization for the SSC is consistent with the Secretary's objective of strengthening Departmental management of its large projects. It provides direct line management authority including an on-site office reporting directly to the headquarters program office, with significant expertise in the area of project management and control.

NUCLEAR PHYSICS

Nuclear processes determine the physical characteristics of our universe. Thus, an understanding of nuclei and nuclear phenomena is essential to understanding the world around us. The science of nuclear physics has spawned many diverse technologies, including nuclear weapons, nuclear power, and nuclear medicine. While these technologies are mature and are conducted independently of the research program, vital interactions still occur in the pursuit of better theories of nuclear structure and reactions, in the development of advanced instrumentation of mutual interest, and in the need for more precise data in selected areas.

The interaction between nuclear physics and other disciplines can be seen in many areas, including medicine and basic materials research. In the area of medicine, Nuclear Physics accelerators provide the facilities for the diagnosis and treatment of cancers using beams of charged particles. Extensive and diverse cooperation also occurs in the area of activation analysis, a nondestructive nuclear technique using small neutron generators to identify, in detail, the composition of complex materials. For example, neutron activation is a widely used technique in oil exploration to identify the substances through which a well test bore passes. Use of this technique to identify trace element impurities shows promise for improving the clean burning of coal; and nuclear physicists active in heavy ion research have helped perfect a process which uses activation analysis to identify plastic explosives that might be smuggled aboard aircraft in the luggage of terrorists.

These applications of basic research are made possible by a growing fundamental understanding of the materials and forces of nature. Over the years, many theoretical models have been developed to describe the structure of the nucleus and its behavior. Models in which nuclear matter is treated as a fluid (liquid drop model) or an organized collection of nucleons (shell model) have been highly developed. More fundamentally, scientists now know that neutrons and protons, the constituents of the nucleus that are called nucleons, are composed of smaller constituents called quarks. These quarks are believed to be bound together in tightly knit groups of threes. Despite many attempts, scientists have not been able to isolate single quarks outside the nucleus. It is as if quarks were tied together by elastic strings that cannot be broken. This confining mechanism forms the basis of the newest theory of the strong nuclear force, called quantum chromodynamics (QCD). Many aspects of this theory are addressed both by the Nuclear Physics and High Energy Physics research programs. However, only the Nuclear Physics program emphasizes tests of QCD predictions of quark behavior in nuclear matter. Only within the medium of nuclear matter can an individual quark be separated from its tightly knit group and studied as a free entity.

The Nuclear Physics research program is carried out at accelerator facilities around the country. Accelerators located at Lawrence Berkeley Laboratory (LBL), Argonne National Laboratory (ANL), Oak Ridge National Laboratory (ORNL), Los Alamos National Laboratory (LANL), Brookhaven National Laboratory, and the Massachusetts Institute of Technology (MIT) support broad research programs with experimental time allocated on the basis of scientific merit. Smaller facilities dedicated to in-house research are located at Yale University, the University of Washington, Triangle Universities National Laboratory, and Texas A&M. In addition, nuclear physics research is performed using experimental facilities located at High Energy Physics accelerators.

In FY 1990, Nuclear Physics accelerators continued providing beams for a vigorous research program. Operating time which was increased at the LBL 88-inch cyclotron and at the Tandem/AGS facility at BNL in FY 1989 will continue in FY 1990. Operations at the Clinton P. Anderson Meson Physics Facility at LANL were enhanced by the start of research using a new source of polarized protons which permitted new detailed measurements of nuclear structure. The LBL Bevalac produced record intensities of uranium beams for its heavy ion research program as a result of continuing improvements and modifications to its accelerators. Similarly, the Holifield Heavy Ion Research Facility at ORNL achieved a new high in terms of both research hours and number of users, with the latter representing 50 institutions.

The experimental research program based on the use of these facilities was also very productive. At ANL, the phenomenon of super deformation was extended to a new region of nuclear masses. Deformed nuclei roughly take the shape of a football. Superdeformed nuclei are approximately twice as elongated as a football. Existing theories cannot explain the transition of nuclei into these shapes. The proposed Gammasphere detector, a gamma ray detector for nuclear structure research which consists of 120 separate and complex Germanium detector units is designed to address this rapidly evolving area. At the Bates Linac at MIT, an international scientific team made the first complete measurement of the charge distribution of the deuteron, which is composed of one proton and one neutron. New techniques and more precise data identified a deformed as well as a spherical component of the electric charge distribution of this simplest possible composite nucleus. The aspect of the nuclear force that gives rise to this deformation could form the basis of improved theories of superdeformation. A combination of results from experiments using the Tandem/AGS at BNL and the Super Proton Synchrotron at the European Organization for Nuclear Research (CERN) have measured the temperature of nuclear matter produced by relativistic heavy ion collisions. These experimental results, combined with extended theoretical calculations, confirm that even higher temperatures will be produced by the proposed Relativistic Heavy Ion Collider (RHIC) facility, which I will discuss shortly. RHIC will permit temperatures high enough to study, for the first time, the quark-gluon plasma, the fundamental quark particles in the nucleus, and the strong force that holds them all in place.

FY 1991 NUCLEAR PHYSICS BUDGET REQUEST

The FY 1991 budget request for the Nuclear Physics program is $330.7 million. Of that total, $215.5 million is for Operating Expenses, $26.7 million is for Capital Equipment, and $88.5 million is for Construction (Table 5).

The FY 1991 Operating Expenses request will maintain an approximately constant level of program activity in low and medium energy physics, in heavy ion nuclear physics, and in nuclear theory. The FY 1991 request provides for an increased level of support for the Continuous Electron Beam Accelerator Facility (CEBAF) with $12.2 million allotted to R&D, testing and prototyping of accelerator components and support of detector development, and $12.4

Table 5
General Science and Research
Nuclear Physics
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Medium Energy Nuclear Physics	$ 85.2	$ 92.4	$ 101.0
Heavy Ion Nuclear Physics	66.5	67.6	72.9
Low Energy Nuclear Physics	24.5	26.3	28.1
Nuclear Theory	10.8	12.2	13.5
Subtotal	$ 187.0	$ 198.5	$ 215.5
Capital Equipment	$ 18.5	$ 19.7	$ 26.7
Construction	52.5*	71.5	88.5
Total Nuclear Physics	$ 258.0	$ 289.7	$ 330.7

million for start-up of laboratory operations and accelerator commissioning. Already, 245 physicists from 60 institutions have submitted 47 research proposals for experiments at CEBAF. From these proposals, a program of experiments will ultimately be selected to be carried out when the facility goes into operation in FY 1994. Special emphasis will continue to be placed on effective use of the upgraded accelerators at the University of Washington, Texas A&M University, and Yale University as well as the Alternating Gradient Synchrotron at Brookhaven. At the University of Washington, the second year of operations of the Nuclear Theory Institute will provide an increased number of study programs and workshops.

Research and development in support of the next generation of accelerators will also be supported by the Operating Expenses request, including work at BNL to extend the scientific and technical basis for the proposed Relativistic Heavy Ion Collider.

The Capital Equipment request of $26.7 million will provide for instrumentation required to effectively use the national accelerator facilities operated by the program. These funds will provide such equipment as particle detection systems, data acquisition and analysis systems, and instrumentation to improve the performance of the accelerators. The Capital Equipment request also includes funds to start assembly of the Sudbury

Neutrino Observatory, a laboratory for neutrino astrophysics, to be built as a collaborative U.S., Canadian, and United Kingdom project. The request also includes funds to begin fabrication of Gammasphere, the gamma ray detector for nuclear structure research that I mentioned earlier. Finally, the FY 1991 request will provide for general purpose equipment to meet the laboratory-wide needs of LBL.

The FY 1991 Construction request for Nuclear Physics is $88.5 million. (Table 6) Of that amount, $65.0 million is for CEBAF, an accelerator with electron beams in the energy range of 0.5 to 4.0 GeV that will provide access to the critical transition region between the traditional (i.e., nucleon) and the emerging (i.e., quark) descriptions of nuclear matter. CEBAF is expected to revolutionize the production and collection of data for nuclear physics research in the area of electromagnetic interactions with nuclei. The FY 1991 construction funds will be used for continued construction of the beam enclosure tunnel and support structures as well as for major hardware fabrication of radio-frequency cavities, cryounits, the central helium liquefier and transfer lines, and the linac and arc magnets.

Table 6
General Science and Research
Nuclear Physics
Budget Authority
($ in millions)

Construction

Project	TEC	FY 1990	FY 1991 Request
Continuous Electron Beam Accelerator Facility (87-R-203)	265.0	62.6	65.0
Relativistic Heavy Ion Collider	397.0	-	15.0
Accelerator Improvements and Modifications	$ N/A	$ 4.5	$ 4.3
General Plant Projects	N/A	4.4	4.2
Total Construction		$ 71.5	$ 88.5

The Construction request also includes $15.0 million to initiate construction of the Relativistic Heavy Ion Collider (RHIC). The Department's Nuclear Science Advisory Committee and the National Research Council have both confirmed the importance of this facility which will provide unprecedented opportunities to produce and study ultradense matter. With a Total Estimated Cost of $397.0 million, RHIC will be a unique, world-class facility with colliding beams that provide collision energies of 100 GeV per nucleon for heavy ions as massive as gold nuclei. At these energies, scientists will be able to form a unique kind of matter called a quark-gluon plasma which will create conditions in the laboratory that are similar to those of the expanding universe moments after the Big Bang. In this plasma, quarks will be separated from their tightly knit clusters and will move independently through the interior of a nucleus. The accelerator will be built in the existing circular tunnel at BNL. FY 1991 construction funds will be used to purchase superconducting wire for fabrication of arc magnets. In other areas, systems engineering and design will be carried on during the first yea of the project.

The Construction request also includes $4.3 million for Accelerator Improvements and Modifications (AIM) and $4.2 million for General Plant Projects (GPP). AIM projects provide for improvements to research accelerators and related experimental facilities, while GPP projects address the need to upgrade general laboratory facilities. These projects are needed to maintain the scientific effectiveness, reliability and efficiency of Nuclear Physics facilities.

GENERAL SCIENCE PROGRAM DIRECTION

The FY 1991 budget request for General Science Program Direction is $3.9 million. The requested funds are required to provide for the salaries, benefits, travel, and other expenses associated with 46 full-time equivalent employees in the Office of High Energy and Nuclear Physics and associated support staff required to administer these programs.

BASIC ENERGY SCIENCES

Basic research is the first link in the chain of events from scientific discovery to technological innovation. Results from research sponsored by the Basic Energy Sciences (BES) program help form the information base that underpins the Nation's nuclear and non-nuclear energy technologies. While the principal focus of the BES program is directed toward supporting the Department's energy goals, a number of other important national goals are also supported, including U.S. leadership in science and technology, the stimulation of economic growth and national defense, and the training of tomorrow's scientists.

Research in the BES program is grouped into six major subprogram areas: Materials Sciences, Chemical Sciences, Applied Mathematical Sciences, Engineering and Geosciences, Advanced Energy Projects and Energy Biosciences. Research in each of these areas is primarily driven by the need for enhanced knowledge or understanding which currently limits existing technologies. The link between basic research and applications, however, is not generally confined to any single energy or technology problem. For example, a new or improved ceramic material may be applied to energy systems--whether they be fossil, nuclear, or automotive--or that material may provide an effective way to immobilize and store radioactive waste. Each of the BES subprograms supports research projects which have applications across a broad range of technologies. Whether the issue is how to burn fuel more efficiently or how to safely and cost-effectively dispose of waste materials, the solution to the problem depends on the results of basic research and the application of those results to the appropriate technology.

In addition to supporting research over a wide range of technical areas, the BES program provides support for the operation of major user facilities such as synchrotron radiation sources, neutron sources, and the Combustion Research Facility at Sandia National Laboratories (Livermore). These national facilities are maintained and operated for the benefit of all qualified researchers from Government laboratories, academia, and industrial laboratories. The seven major BES user facilities are critical to the success of the BES research program and are playing an increasingly important role in research carried out by the private sector. At the synchrotron light sources, for instance, the largest U.S. companies are doing research in such areas as catalysis and electronics; and major oil companies are investigating the porosity of geologic formations using the neutron sources. Advances in materials, chemistry, biology, and the next generation of computer chips truly depend on these facilities.

During the last year, the Department carried out an extensive review of its nuclear facilities. Based on this review, the Secretary decided to transfer management of all nuclear research reactors, including BES's High Flux Isotope Reactor and High Flux Beam Reactor, to the Assistant Secretary for Nuclear Energy. The respective program offices retain responsibility for funding and directing these scientific facilities.

Approximately 60 percent of the BES-supported research is carried out at the national laboratories where all but one of the user facilities are located. Since these laboratories are also involved in many aspects of the applied energy programs, they are skilled at facilitating the transfer of scientific information and technology from experiment to application. The BES program also provides significant direct funding support to universities, in addition to providing them with research time at the various user facilities.

Every year there are important results in each of the research areas supported by the BES program. Some of the most interesting recent results include:

o Surprising research results discovered by Nobel Laureate Y. T. Lee at LBL. These results were obtained using molecular beams to study chemical reactions of energetic benzene molecules. Benzene is a minor but common constituent of many fuels and thought to be a major contributor to soot formation. Using laser radiation, Professor Lee is able to cause individual benzene molecules to begin to degrade chemically, just as they would do in the environment characteristic of combustion. His experiments have demonstrated surprisingly extensive rearrangements of benzene's constituent hydrogen and carbon atoms - much more extensive than would have been anticipated from conventional chemical wisdom. This research has potentially far-reaching implications for chemistry and, ultimately, for the design and control of optimum combustion systems.

o Development at Ames Laboratory of a new, simple, and efficient way to synthesize silicon carbide. This new approach, which makes it possible to produce silicon carbide in the form of fibers, is likely to cut both the time and the cost of current commercial production of silicon carbide fibers. Materials containing these silicon carbide fibers are replacing metal in industrial and military applications due to their strength, low weight, high heat tolerance, and resistance to chemical breakdown. A patent application has been filed, and several industrial concerns have expressed serious interest in this new development.

o Development by scientists at the Princeton Plasma Physics Laboratory of an X-ray laser microscope that is capable of revealing the details of biological systems. This accomplishment, which was recognized by a 1989 R&D 100 Award, allows scientists to take pictures of living cells and observe such processes as the invasion of a virus. The availability of this microscope is expected to greatly expand our ability to study the structure and dynamic processes of biological cells.

o Development of a new imaging technique at ORNL that can "see" new details of defects in high temperature superconductors and many other materials. Using this technique, scientists have learned that the achievement of high critical current densities in the oxide superconductors depends strongly on the geometry of certain defects. These high current densities are one requirement for practical applications of high temperature superconductors in electric motors, generators, and transmission lines. This result leads to renewed optimism that current densities in high temperature superconductors can be raised to useful levels.

- Development at ANL of a new class of chemicals for environmental and nuclear waste applications. These chemicals, called thermally unstable complexants, are environmentally compatible chemical clean-up agents. They remove transuranic and other metal contaminants from waste streams to very low levels and, after further development, could be applied to nuclear wastes, ground water, and metallurgical processes.

- Development of a mathematical technique that makes possible computer modeling of the propagation of cracks in materials, such as airplane fuselages and engine fan blades. The annual cost of fracture-related damage in the U.S. has been estimated at over $10 billion. This new mathematical technique, discovered at Oak Ridge National Laboratory, has been implemented in a structural analysis computer program by Cornell University to form a useful tool in material structure studies.

FY 1991 BASIC ENERGY SCIENCES BUDGET REQUEST

The FY 1991 budget request for Basic Energy Sciences is $648.7 million. The request includes $503.7 million for Operating Expenses, $37.0 million for Capital Equipment, and $108.0 million for Construction. (Table 7)

The Operating Expenses request maintains a strong core research program in each of the BES subprograms. Research in Materials Sciences continues to improve our theoretical and experimental capability to analyze the fundamental structure and behavior of materials. In doing so, materials research contributes to the development of new or substitute materials that can improve performance and efficiency in energy systems. It creates the capability to tailor materials properties to satisfy defined requirements, such as improved corrosion resistance in fossil plants, and to predict materials problems and service life. The 1991 request of $222.0 million will provide for continuing

Table 7
Energy Supply R&D
Basic Energy Sciences
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Materials Sciences	$ 173.7	$ 198.7	$ 222.0
Chemical Sciences	127.8	140.3	150.5
Applied Mathematical Sciences	42.1	43.7	48.0
Engineering and Geosciences	32.8	33.2	32.5
Advanced Energy Projects	14.3	14.6	24.0
Energy Biosciences	20.4	20.6	20.2
Program Direction	4.9	5.4	6.5
Subtotal	$ 416.0	$ 456.5	$ 503.7
Capital Equipment	31.7	36.5	37.0
Construction	86.6	76.8	108.0
Total Basic Energy Sciences	$ 534.3	$ 569.8	$ 648.7

research programs in high temperature superconductivity, solid state physics, materials chemistry, metallurgy, and ceramics. Funding for support of major user facilities is also included in this request.

The Chemical Sciences subprogram, with an FY 1991 request of $150.5 million, investigates the chemical properties of matter and the interactions of the component molecules, atoms, ions, and electrons. Chemical sciences research ultimately affects such areas as production of fuels and chemicals from coal, nuclear waste separation, conversion of biomass (such as wood and leafy materials) into liquid fuels, and detection and measurement of harmful products of energy processes. In FY 1991, the research program will emphasize areas relevant to the environment, waste management, and combustion. The FY 1991 budget request also includes support for major user facilities.

Applied Mathematical Sciences supports long-range mathematical and computational research. Computational methods provide insights into experimental data and simulate ideal experiments for testing analytical models. This subprogram advances all aspects of scientific computation--from proofs of theorems about mathematical equations to understanding the structure of parallel computer systems. With an FY 1991 request of $48.0 million, Applied Mathematical Sciences will continue to provide access to, and expand the capabilities of, the supercomputer network that is essential for researchers supported by the Office of Energy Research. Selected increases will be provided for research, fellowships, and problems identified in the Government-wide initiative in high performance computing. This initiative, which is being coordinated by the Federal Coordinating Committee on Science, Engineering and Technology (FCCSET), recognizes the need to maintain and extend U.S. leadership in high performance computing. As a major user of high performance computing and a pioneer of the use of supercomputers for modeling complex physical systems that are too dangerous, expensive, or poorly understood to build and test, DOE strongly supports this initiative and looks forward to playing a key role in achieving its objectives.

The Engineering and Geosciences subprogram, with an FY 1991 request of $32.5 million, includes two broad disciplines. Research in engineering aims to expand our knowledge of the processes and concepts that underlie current engineering practice in energy technologies and to broaden the technical and conceptual base for solving future problems. The FY 1991 request will continue fundamental engineering research with emphasis on topics important for energy production and use, as well as those meeting the Department's long-term objectives for restoration of the environment. Such topics include flow of oil, gas, and water through porous materials such as soil and rocks and two phase flow in energy systems--for instance, mixtures of water and steam in nuclear reactors. Work is also underway on what are called intelligent machines, for example, the mobile robots to be used for cleanup of contaminated sites. In Geosciences, the research emphasizes the development of a predictive understanding of the energy-related aspects of geological, geophysical, and geochemical process related to the Earth. Emphasis in FY 1991 will be on high-resolution underground imaging related to enhanced oil recovery and waste management, as well as on continental scientific drilling. In the latter area, site studies to investigate existing geological structures will be carried out at Katmai, Alaska where drilling is scheduled to start in FY 1992.

The Advanced Energy Projects subprogram, with an FY 1991 request of $24.0 million, explores the feasibility of novel, energy-related concepts evolving from basic research that are at an early stage of scientific definition and, therefore, are not yet of practical use to technology programs. In FY 1991, research will continue on heavy ion accelerators with the goal of validating this technology as a possible inertial fusion driver; and additional funds will be provided on a cost-shared basis with industry to transfer synchrotron radiation technology (x-ray lithography) to industry for use in developing next generation computer chips.

The FY 1991 request for the Energy Biosciences subprogram is $20.2 million. Research in this area continues to increase our understanding of basic biological principles, biological mechanisms, and organisms useful for energy applications, such as the production of fuels from biomass materials. In FY 1991, this subprogram will continue its base program in plant and microbial sciences, including support for the plant science centers supported jointly by the Department, the National Science Foundation, and the Department of Agriculture.

The Program Direction request for FY 1991 is $6.5 million. This request will provide funds for the salaries, benefits, and travel related to 70 full-time equivalent staff.

The BES Capital Equipment request for FY 1991 is $37.0 million. These funds will ensure that BES-supported researchers will continue to have the equipment needed to initiate and continue advanced research, much of which involves experiments at extremes of temperature and pressure. Reliable, precise measurements under these conditions challenge the current state-of-the-art. Replacements and new equipment funded under this request, which are important to the continued success of the program, include such items as electron microscopes, neutron spectrometers, molecular beam equipment and computers for equipment control and data analysis.

The FY 1991 Construction request of $108.0 million (Table 8) includes continued funding for the construction of the 1-2 GeV Synchrotron Radiation Source at LBL as well as the 6-7 GeV Synchrotron Radiation Source at ANL. Both facilities are needed to cover the entire radiation range needed for experiments supported by the BES program. The 1-2 GeV project is a third generation light source in the vacuum ultra violet/soft x-ray range. The unique capabilities of this facility will make possible new basic and applied science studies in such areas as materials and surface science, atomic and molecular physics, chemistry, and biology. The FY 1991 request includes $23.0 million for this project. The 6-7 GeV project is a new, hard x-ray synchrotron light source which has been rated as the top priority by several scientific panels, including one from the National Academy of Sciences. It will provide brilliant x-ray beams that will serve the research needs of virtually all scientific disciplines and many technology fields. The FY 1991 request for this project includes $75.0 million to continue accelerator and conventional facility construction. Of the remaining $10.0 million, $7.0 million is for Accelerator Improvements Projects and $3.0 million is for General Plant Projects. Each of these categories is comprised of smaller projects which are necessary to maintain plant and facilities at several DOE laboratories. The projects include a wide spectrum of improvements necessary to protect property and personnel and to modify existing scientific facilities to allow the most cost-effective utilization of their technical capabilities.

MAGNETIC FUSION ENERGY

Fusion is the process by which the sun and other stars produce energy. The continuing goal of the Magnetic Fusion Energy program is to develop theory and conduct experiments to determine how fusion reactions can be controlled and used to produce energy. Steady progress has been made but the scope of work is formidable. Fusion is an attractive source of energy for several reasons. The fusion fuels (deuterium and tritium) are easily obtained and virtually inexhaustible. In addition, fusion reactors can be designed to yield very little long-lived radioactive waste. Finally, fusion powerplants would have

Table 8
Basic Energy Sciences
Construction Summary
($ in millions)

Project Title	TEC	FY 1990	FY 1991 Request
1-2 GeV Synchrotron Radiation Source (LBL)	$ 99.5	$ 25.6	$ 23.0
3 GeV SPEAR Injector (SSRL)	14.0	4.5	0
6-7 GeV Synchrotron Radiation Source (ANL)	456.0	39.4	75.0
Accelerator Improvements Projects	N/A	4.5	7.0
General Plant Projects	N/A	2.8	3.0
Total Basic Energy Sciences Construction		$ 76.8	$108.0

attractive safety features because there would be only small amounts of relatively low-hazard fuel present at any one time and the fusion reaction could not run out of control.

The path to successful development of magnetic fusion energy for practical use requires development of a device that can heat the deuterium-tritium fuel to the required high temperature and confine the heated fuel long enough so that more energy is released in the fusion reactions than is used to heat the fuel; in other words, a significant energy gain is achieved. The leading candidate for confining the hot plasma fuel is a donut-shaped magnetic configuration called a tokamak. The program is currently trying to enhance its understanding of energy confinement in order to clarify the requirements for significant energy gain. In addition, research and development are required to improve the potential economics of fusion. Finally, the Magnetic Fusion Energy program is participating in the initial phase of an integrated world-wide program whose long-term objective is to establish the science and technology base for fusion and, thus, create opportunities for the U.S. to benefit from collaboration on major facilities.

The program is organized around four key technical issues. The first is understanding how the plasma behaves once fusion reactions are producing sufficient heat to maintain reacting or burning conditions. The second is determining the best confinement configuration by studying potentially improved devices or fuels. The third issue involves research on materials to see which ones provide the best safety margin and the lowest levels of induced radioactivity when introduced to a fusion reactor environment. The fourth issue requires the development of the nuclear technology to effectively and safely convert fusion energy to electricity.

The program currently emphasizes the first two issues. These efforts are aimed at developing a predictive understanding of the mechanisms that control energy confinement within the tokamak. Experimental data suggest that improved confinement will be required for the next generation of devices. Scientists have already observed this improved confinement in a number of tokamak devices. The program is working on developing the understanding necessary to apply these observed improvements to future devices.

Before I turn to a discussion of the FY 1991 budget request, I should note that an independent, high-level review of fusion will be carried out in FY 1990. The objective of the Fusion Policy Advisory Committee will be to review and update the Department's fusion policy, covering both the magnetic and inertial confinement programs. The Committee review will focus on the technical status of the programs and will recommend how to structure them. The FY 1991 budget request provides for maintaining the current magnetic fusion program balance, with a focus on confinement physics. Budget estimates will be revised as necessary once the review is completed and the Department has determined what changes, if any, to make in the program.

FY 1991 MAGNETIC FUSION ENERGY BUDGET REQUEST

The FY 1991 budget request for Magnetic Fusion Energy is $325.3 million. This includes $291.9 million for Operating Expenses, $14.3 million for Capital Equipment, and $ 19.1 million for Construction (Table 9).

The Fusion budget is organized into five major subprograms: Confinement Systems, Applied Plasma Physics, Development and Technology, Planning and

Table 9
Energy Supply R&D
Magnetic Fusion Energy
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Confinement Systems	$ 172.7	$ 160.2	$ 163.0
Applied Plasma Physics	81.2	71.6	70.9
Development and Technology	54.1	47.4	48.1
Planning and Projects	1.1	4.2	4.2
Program Direction	4.6	5.0	5.7
Subtotal	$ 313.7	$ 288.4	$ 291.9
Capital Equipment	18.8	13.3	14.3
Construction	12.2	18.6	19.1
Total Magnetic Fusion Energy	$ 344.7	$ 320.3	$ 325.3

Projects, and Program Direction. Confinement Systems, with an FY 1991 Operating Expenses request of $163.0 million, operates large experimental devices and analyzes the data to improve our understanding of plasma behavior and to learn how to obtain and control the physical conditions necessary to ultimately produce fusion energy. Research is currently being conducted on several toroidal devices, primarily tokamaks, to investigate key physics issues and prepare for performing burning plasma physics experiments on future devices. One important aspect of present experimental research is the effort to obtain a better understanding of transport, or energy loss, in tokamak plasma systems.

The Tokamak Fusion Test Reactor (TFTR) at Princeton Plasma Physics Laboratory (PPPL) is the largest U.S. tokamak, with a long-term goal of conducting plasma experiments using deuterium-tritium fuel at plasma temperatures and densities similar to those anticipated in a future fusion reactor. During the past calendar year, the TFTR program has focused on the energy transport issue. New diagnostics were fabricated and installed, and new techniques for obtaining improved confinement were developed. The Advanced Toroidal Facility at ORNL will contribute to the understanding of confinement in tokamaks, while Doublet III-D at General Atomics is the focal point for a variety of ongoing experiments on plasma transport. During the past year, scientists at Doublet

III-D also achieved a new world record beta value for tokamaks. Beta is defined as the ratio of the plasma thermal energy to the magnetic pressure that is used to confine the plasma. Doublet III-D experiments achieved a peak beta value as high as 9.3 percent and sustained a beta value of 8 percent for almost a second. This is greater than the beta value thought to be necessary for economical fusion reactors. Abroad, the Joint European Torus in Great Britain has essentially reached equivalent energy breakeven conditions in deuterium, in other words, conditions where the energy released is equal to that required to heat the fuel.

Upgrades for microwave heating experiments on the Princeton Beta Experiment will be completed in FY 1990 and the device will resume its research operations aimed at operating under higher plasma pressure conditions in FY 1991. Fabrication of the Alcator C-Mod facility at the Massachusetts Institute of Technology will be completed in early FY 1991, and initial operations are planned for FY 1991. This facility will allow scientists to study plasma performance with a compact, high-field, high-density design using improved plasma edge controls in support of a future burning plasma physics experiment. Preliminary design activities for the Compact Ignition Tokamak will continue to improve projected performance. Technology R&D will also be conducted in support of prototype development.

Applied Plasma Physics, with an Operating Expenses request of $70.9 million, plays a major role in addressing the magnetic confinement and burning plasma physics issues at a very fundamental level. The subprogram conducts research on potentially attractive advanced confinement configurations and on basic magnetic confinement physics. It also develops information on new diagnostics and techniques to heat and control plasma, and provides computational and theory support for the overall program. In FY 1991, this subprogram will continue to expand our understanding of magnetically confined plasma through experiments with various magnetic configurations, including tokamaks, compact toroids, and reversed field configurations. Fabrication of the Large S Experiment (LSX) will be completed at Spectra Technologies in FY 1990 to further investigate the potentially attractive field reversed configuration concept. The Confinement Physics Research Facility, under construction at the LANL, will improve our understanding of reversed field pinches once it is operating. I will refer to this project later when I discuss the program's Construction request.

In FY 1991, research on applied plasma physics theory will give special emphasis to modelling and understanding the process of controlling the transport of energy and particles in toroidal plasma. The Texas Experimental Tokamak (TEXT) at the University of Texas will be operated with new electron cyclotron heating and diverter hardware in order to compare transport data with other tokamaks. Support is also provided for the continued operation of the computer center at LLNL and the five user service centers. The computing capability will be improved through faster network access and additional local computing work stations.

With an Operating Expenses request of $48.1 million, the Development and Technology subprogram will continue to support the development of technologies required for fusion experiments and the design and analysis of fusion systems. During the last year, the first phase of the tritium proof-of-principle pellet experiments was completed at the Tritium System Test Assembly at LANL. During those experiments, scientists from ORNL obtained information that demonstrates the feasibility of tritium pellet fueling for next-generation experiments.

A number of international collaborative programs will be supported in FY 1991, including the International Thermonuclear Experimental Reactor (ITER). The ITER process is developing into a successful and unique model for large-scale, equal participation, international projects. An Interim Conceptual Design Report has been completed, with the full Conceptual Design Report to be completed in December 1990. ITER-related technology R&D tasks have been defined and are under way in each of the participant countries as part of the $8.0 million ITER technology R&D funding provided by each participant. Physics R&D tasks are being undertaken on a voluntary basis by the home program of participating countries. The Massachusetts Institute of Technology has just completed a pulsed superconducting coil winding, which is expected to be a technology applied to ITER for driving the plasma current. The coil will be shipped to Japan in March 1990 for joint testing by the U.S. and Japan. Successful operation of this large (2 meter) coil would be a major step in pulsed coil technology and would allow scale-up to full-sized, pulsed, superconducting ITER coils. With the conceptual design activity nearly completed, the U.S. will decide whether to enter discussions on the engineering design phase of ITER. A final decision on continued U.S. participation in ITER will depend on a variety of factors, including the recommendations of the Fusion Policy Advisory Committee and the outcome of the annual budget process.

The FY 1991 budget essentially provides for a continuation of FY 1990 activities. This includes such areas as development of high-field, steady-state, pulsed magnets and plasma heating and fueling components, development of low activation and radiation-resistant structural materials that have acceptable characteristics for the fusion reactor environment, and tasks to enhance the environmental and safety advantages of fusion. Materials also need to be developed that can resist high heat flux and erosion by the bombardment of plasma particles. Fusion nuclear components will continue to be developed to produce and process tritium safely and convert fusion energy into useful forms.

Finally, systems design work aimed at developing improved reactor designs, including inertial confinement concepts, is supported. Support of design and validating R&D for ITER is also supported.

The Planning and Projects subprogram provides support for construction of major new facilities and fabrication of auxiliary components for these facilities. The FY 1991 Operating Expenses request of $4.2 million is primarily for compliance with requirements associated with the Small Business Innovation Research program.

The Operating Expenses request of $5.7 million for Program Direction provides for personnel and other costs associated with 64 full-time equivalent employees.

The FY 1991 Capital Equipment request of $14.3 million will provide for essential hardware to support the overall program. This equipment includes diagnostic and computer equipment, power supplies, and other components for experimental facilities.

The FY 1991 Construction request of $19.1 million (Table 10) provides $11.1 million for continued construction of the Confinement Physics Research Facility (CPRF) at LANL. The CPRF will provide an experimental capability to explore the physics properties of a reversed field toroidal confinement experiment that has the theoretical capability, in a future device, of heating the plasma to ignition with lower magnetic fields. The FY 1991 request will allow the program to complete fabrication of the coils and the vessel and shell, to begin installation of these components, and to complete generator start-up tests.

Table 10
Magnetic Fusion Energy
Construction Summary
($ in millions)

Project Title	TEC	FY 1990	FY 1991
Confinement Physics Research Facility (89-R-800)	75.6	10.9	11.1
General Plant Projects	N/A	7.7	8.0
Total Construction		18.6	19.1

The remainder of the Construction request, $8.0 million, is for General Plant Projects (GPP). These GPP projects at LANL, PPPL, and ORNL provide for the continuing minor alterations and modifications necessary to protect the Government's investment in its facilities.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

The Biological and Environmental Research (BER) program supports research aimed at identifying, understanding, and anticipating the long-term health and environmental consequences of energy development and use. The program also contributes to the solution of major scientific problems in medicine and biology through the use of the Department's unique scientific and technological capabilities.

The BER research program, with its focus on human biology and health and on the environment, grew out of the program's initial mission to understand the potential health and environmental impacts of radiation. As definitive information was obtained concerning relatively high levels of radiation exposure, attention was turned to potential effects at lower doses that might be received by worker populations or the general public. This concern led to epidemiology studies on selected populations, such as contractor employees, and a more comprehensive research program involving experimental animal, cellular, and molecular studies.

The Department's human genome program represents a new approach, based on modern biology and technology, to the more than forty year old mission of evaluating effects of low doses of exposure to energy-related agents. The knowledge that will flow from this program will open new levels of understanding about the effects of radiation and chemicals on the most fundamental level of life--the DNA molecule. Combined with the increased understanding of biological structure and function provided by research in structural biology, the results of these research activities are providing and will continue to provide methods, data, and processes for biotechnology applications. Potential applications include new drug designs, protein engineering of enzymes and other catalysts for industrial processes, diagnostics for medical diseases, and applications of biotechnology for environmental restoration.

The environmental research program, in a similar manner, evolved from an initial need to understand the pathways of radioactive materials from weapons testing through atmospheric, marine, and terrestrial environments to human exposure. The research base established within the DOE environmental research program has helped provide a quantitative understanding of the processes that affect the environmental fate of energy-related materials and, thus, has enabled DOE to respond effectively to recent national concerns such as acid rain and possible global warming from the increase of carbon dioxide and other greenhouse gases. Important research related to subsurface contamination and ground water is also underway and is expected to contribute significantly to environmental restoration activities.

The Department's research in medical applications also evolved from the original mandate to promote the use of radioactive materials for medical applications. As progressively sophisticated applications for diagnosis and treatment of diseases evolved, nuclear medicine became a recognized medical specialty and radionuclide production developed into a flourishing industry. The Department's research in this very important field of medicine continues to produce new information and technologies that make possible more effective and safer ways to diagnose and treat a variety of diseases, including cancer and heart disease.

FY 1991 BIOLOGICAL AND ENVIRONMENTAL RESEARCH BUDGET REQUEST

The FY 1991 budget request for the BER program is $338.8 million. Of that amount, $323.7 is for Operating Expenses, $11.6 million is for Capital Equipment, and $3.5 million is for Construction. (Table 11).

The Health Effects research activity, with an FY 1991 Operating Expenses request of $73.1 million, will provide for continued research in epidemiology, radiation biology, and chemical toxicology. This research will provide the information needed to correlate the relationships between exposure to chronic, low levels of chemicals or radiation and the consequent biological response. In addition to increasing our scientific understanding of these relationships,

Table 11
Energy Supply R&D
Biological and Environmental Research
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Late Effects on Health & Environment of Energy Development and Use			
Analytical Technology	$ 14.2	$ 15.2	$ 17.0
Environmental Research	36.3	40.5	44.7
Health Effects	64.9	71.5	73.1
General Life Sciences	45.4	56.2	80.2
Medical Applications	36.1	37.3	37.0
Carbon Dioxide Research	17.4	50.0	65.9
Program Direction	4.0	4.5	5.8
Subtotal	$ 218.3	$ 275.2	$ 323.7
Capital Equipment	9.0	11.3	11.6
Construction	23.5	22.2	3.5
Total	$ 250.8	$ 308.7	$ 338.8

results from this research will continue to provide input to occupational exposure standards and, ultimately, will lead to healthier and safer environments in the workplace.

The epidemiology research supported by the BER program is concerned with the health consequences of energy production and use as well as the consequences of working at or living near DOE facilities. Extensive data bases on the Department's contractor worker population have been compiled in connection with studies of chronic exposures to ionizing radiation. In response to the need to organize and integrate data from these studies, as well as data on other DOE worker populations living near DOE facilities, and on other populations such as workers in the energy industry, the FY 1991 request includes a continued effort to develop the Comprehensive Epidemiologic Data Resource (CEDR). This resource will be available to all qualified epidemiologic research investigators.

The CEDR, which is one element of the Secretary's four-point epidemiologic initiative, will be a national database containing validated data useful for epidemiologic research. A draft of the CEDR program plan has been completed; working groups have been formed to develop full implementation plans; an interim version of the CEDR, containing some data for dissemination, has been completed; and acceleration of activities to complete data collection on DOE workers has begun. While we expect to have intermediate versions of CEDR available for dissemination during the development process, full implementation is scheduled for the end of FY 1995. A major programmatic review of the Department's epidemiologic research activities was started in 1989 by the Secretarial Panel for the Evaluation of Epidemiologic Activities. The Interim Report of the Panel to the Secretary was received in November, 1989. The Panel made a number of recommendations, including several related to the release of data on DOE workers to researchers outside of the Department. The Department is in the process of addressing the Panel's recommendations.

The FY 1991 Health Effects request also provides for continuing the basic scientific research needed to understand and predict the health risk associated with exposure to indoor radon. This research includes determining the availability and transport of radon in the environment and its behavior indoors. It also includes measuring and characterizing human exposure to radon more accurately, better defining health risk estimates, and determining the role of radon exposure in combination with smoking in causing lung cancer. Estimates of the risk of incurring lung disease from exposure to radon are derived from experience with exposures in uranium mines. Most of the smallest particles on which radon decay products are deposited become trapped in the nasal cavity and, thus, do not enter the lungs. Further research, which will include animal exposure studies and extension of current studies from model indoor systems to real residences, could have implications for what are currently considered to be the exposure levels requiring corrective actions.

The FY 1991 request for General Life Sciences research is $80.2 million. This program will continue to emphasize molecular and cellular studies to examine how key biological processes operate, as well as studies of the structure of key macromolecules like DNA. Using this knowledge, researchers can learn more about how physical and chemical agents affect living processes. The research also identifies early indicators of biological damage, teaches us how cells repair themselves, and leads to new techniques for analyzing biological damage.

Much of the damage to DNA that is caused by radiation and chemicals is repaired by the body's own built-in defenses. This repair process has important implications for accurately evaluating the risks and potential health impacts of these agents. Advances in our understanding may even have considerable potential for therapy. Progress has been made during the last year at LLNL, LANL, and ORNL where researchers were able to isolate specific human genes involved in the repair of DNA damage caused by ultraviolet light and certain types of chemicals.

A major FY 1991 focus in General Life Sciences research will be the DOE human genome effort which is developing new instrumentation and methodologies that will make research on the molecular structure of the human genome, which is the complete set of genetic instructions that make a human being, less costly and less labor intensive. The FY 1991 request of $45.9 million expands human genome research aimed at developing improved technologies for sequencing DNA, constructing physical maps of each human chromosome, developing computational capabilities for analyzing and manipulating data, and facilitating technology transfer. During the last year, progress has been made at LANL, LLNL, LBL, and the University of Chicago, respectively, where scientists have developed: a new physical mapping technique currently in use in mapping chromosome 16, an automated technique being used to map chromosome 19, a common language that would allow all physical maps of chromosomes to be described electronically, and a new method of cutting human DNA into fragments that will greatly facilitate chromosome mapping. Also during the last year, DOE and the National Institutes of Health (NIH) completed a five-year plan for the national human genome program which DOE and NIH jointly plan and carry out. The DOE portion of the program focuses on developing technical capabilities and tools, while the NIH effort is oriented toward characterizing disease-oriented genes, through use of both human and non-human model systems.

The FY 1991 request for Analytical Technology is $17.0 million. This request will provide for research directed at developing new and more sensitive instruments to make physical, chemical and biological measurements of energy-related emissions. These instruments will also assist scientists in measuring human exposure and biological response to those emissions. These more precise measurements are crucial to further progress in understanding indoor radon, as well as damage to DNA and to the environment from energy-related missions.

The FY 1991 budget request for Environmental Research is $44.7 million. This research activity, together with the Carbon Dioxide Research activity, which I will discuss next, provides information needed to address a number of important issues, including atmospheric chemistry, global climate processes, the resiliency of ecosystems and marine coastal areas to energy activities, and environmental restoration around DOE facilities that have been used for energy and weapons-related operations and R&D.

The Environmental Research request will provide for continued research aimed at determining how energy-related agents move through and are changed by the atmosphere, oceanic and terrestrial ecosystems, and how they ultimately affect humans. Scientists are also looking at how the environment itself may be affected by energy-related activities and how negative effects can be mitigated.

The FY 1991 request will also support a series of major field studies of the processing of sulphur and nitrogen oxides by clouds and precipitation, and the mechanisms by which they are deposited on sensitive ecosystems. This work will contribute to a more informed approach to possible emission control strategies aimed at addressing the acid rain problem.

Long-term research directed at contamination of subsurface sediments and ground water by mixed wastes from DOE sites will also be carried out. This research provides the underpinning for cost-effective management and remediation of contamination from the Department's energy and weapons-related project wastes. One example of the productive results stemming from research in this area is the recent development at Pacific Northwest Laboratory of an innovative sensor for detecting liquid contaminants such as fuel oil or solvents within soil. This sensor is less expensive, simpler, and more accurate than existing sensors, and the technology is now available to industry for commercialization. In FY 1991, research related to subsurface contamination will be directed at improved environmental measurement technology and at physical, chemical, and biological interactions that control the transport of mixed contaminants. Research on biological remediation techniques using microorganisms found at depths of up to 2000 feet also will be emphasized.

Another very important research area in FY 1991 relates to possible global change from the increase of greenhouse gases and, especially, from carbon dioxide. The Department's Carbon Dioxide Research program, for which the FY 1991 budget request is $65.9 million, is the principal DOE activity in the U.S. Global Change Research Program organized by the Committee on Earth Sciences (CES) of the Office of Science and Technology Policy. The Secretary of Energy has identified global climate change as an important environmental consideration in the development of the National Energy Strategy. Consequently, DOE has launched a major research initiative to provide the scientific underpinning for prediction of global and regional climate change. A principal component of this initiative is an experimental program to quantify cloud formation processes. Using measurement and modeling techniques, researchers will examine the roles of clouds and their effect on the sun's naturally occurring radiation (i.e., the radiative effect) in climate change. The information gained from such research is essential for improved prediction. A second component is an effective integration of advanced computer hardware and software with the next-generation climate models in order to accelerate computer operations by a factor of 10,000 within the next ten years.

The program will continue to seek multidisciplinary input from the scientific community to gain a broad perspective. Climate change research activities throughout the Department are being coordinated by the Office of Energy Research, with interagency coordination being implemented through the CES. International activities are coordinated through such organizations as the Intergovernmental Panel on Climate Change.

The Medical Applications activity, with an FY 1991 budget request of $37.0 million, carries out a wide range of projects aimed at the beneficial medical application of energy-related technologies. Over the years, the Department's medical research has provided information that has led to the widespread use of nuclear technology in modern clinical and laboratory medicine, opening avenues of diagnosis and treatment that otherwise would not have been available. Research in FY 1991 will focus on non-invasive diagnosis and treatment techniques, development of improved instrumentation, and improved methods for studying brain and heart function and for diagnosing abnormalities in these organs. For instance, studies using Positron Emission Tomography, commonly known as PET scans, have identified areas in the brain that are most affected by alcohol and cocaine. These studies provide information about the neurochemical mechanisms through which these substances act on the brain. Further studies will be directed to determining whether it is possible to recover from the damage that is produced. Another use of PET scans is to locate the lesions in the brain that cause epileptic seizures. This information is useful as a guide to surgical treatment. PET scans can also help to determine which patients will benefit from coronary by-pass surgery.

The FY 1991 request for Program Direction is $5.8 million. These funds are required to pay for the personnel costs of 65 full-time equivalent (FTE) staff to direct, manage, and support BER's multidisciplinary research efforts. The FY 1991 request for Capital Equipment is $11.6 million. This request supports replacement of deteriorated and obsolete equipment at the laboratories as well as acquisition of new, state-of-the-art equipment, particularly for human genome and carbon dioxide research.

The request for Construction in FY 1991 is $3.5 million. The General Plant Projects that fall under this request are necessary to keep the general plant of the laboratories (e.g., buildings, roads, and utilities) in good operating condition.

Now let me turn to the several ER programs that are related to my statutory responsibilities to advise the Secretary on DOE's research and development programs, on the non-weapons multiprogram laboratories, and on the education and training of scientists and engineers.

ENERGY RESEARCH ANALYSES

The Energy Research Analyses (ERA) program carries out technical assessments and research analyses that cover all aspects of the Department's civilian R&D programs. These in-depth reviews provide information on the quality of the research and its impact, as well as identify opportunities for future research. In 1989, reviews of the Photovoltaics, Flue Gas Cleanup, and Chemical Toxicology programs were completed. A major research needs assessment on coal liquefaction was also completed and will provide valuable information to help guide the program for the next several years.

In addition to carrying out technical assessments and analyses, the ERA program plays a key role in coordinating the Department's involvement in acid rain research. Specifically, the program provides funds under the National Acid Precipitation Assessment Program (NAPAP) for summarizing the state of the science in acid rain research and producing assessment reports useful to policymakers. ERA's emphasis on technical peer reviews has made a major contribution to NAPAP's final report which is being prepared in FY 1990 and will be completed in FY 1991.

The FY 1991 budget request of $3.7 million will provide funding for peer reviews and technical assessments of programs in the Office of Energy Research, as well as programs under the Assistant Secretary for Fossil Energy and the Assistant Secretary for Conservation and Renewable Energy. In addition, funds will be provided to assess responses to the final NAPAP report and to continue to monitor interagency research results related to clean air issues.

UNIVERSITY AND SCIENCE EDUCATION

There is a growing consensus that one of the most serious problems facing the Nation over the next ten years is the declining number of young Americans, including women and minorities, interested in pursuing careers in science and engineering. Those who are interested often receive inadequate preparation for such careers. This crisis in science education has serious implications for the Nation's continued international economic and technological competitiveness. It also has implications for the Department's ability to carry out its science, energy, and defense R&D missions.

The Department is both a user and a patron of a large fraction of the Nation's scientists and engineers. To meet the challenges facing the Department today and in the future, we have to depend on the scientific creativity and technical skills of our workforce. DOE is uniquely positioned to provide major assistance to the national effort to strengthen science and engineering education. The Department's long tradition of support for science education continues today. Several of our laboratories have been designated as Science Education Centers and are carrying out comprehensive science education programs. Our efforts complement those of the National Science Foundation, the Department of Education, and other Federal agencies, state and local governments, and the education community by providing students and their teachers with "hands on" experiences in ongoing, cutting-edge scientific and technical research.

Secretary Watkins has made support for science education a personal and Departmental goal. He was an active participant in the President's Charlottesville Summit Conference. Last October, shortly after the Conference, the Secretary and Nobel Laureate Glenn Seaborg cohosted a Math/Science Education Action Conference in Berkeley, California. Over 200 senior representatives from Federal agencies, Congress, education associations, States, industry, and the National Laboratories met in working groups to formulate the outline of an action plan to improve science education dramatically by the year 2007.

The FY 1991 budget request of $29.7 million for University and Science Education reflects, in part, the Secretary's and the Department's commitment. (Table 12) This request will continue the existing base programs, including undergraduate student summer and semester research programs as well as faculty and graduate student research activities. The FY 1991 request will also include new activities responsive to the Secretary's Math/Science Education Action Conference and to recent reports including the Energy Research Advisory Board's report on the Department's potential role in science education; the Interagency Task Force on Women, Minorities, and the Handicapped in Science and Technology report, "Changing America: The New Face of Science and Engineering;" and the National Research Council report, "Everybody Counts."

Table 12
Energy Supply R&D
University and Science Education
Budget Authority
($ in millions)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses			
Laboratory Cooperative Science Centers	$ 11.2	$ 11.9	$ 18.2
University Programs	6.8	6.8	1.9
University Reactor Fuel Assistance	2.0	4.0	7.2
R&D Laboratory Technology Transfer	1.4	2.2	2.4
Total University and Science Education	$ 21.4	$ 24.9	$ 29.7

Among the new initiatives in FY 1991 are inner city/rural partnerships designed to revitalize math and science education in targeted school districts. Another initiative will be the establishment of a precollege mathematics science education program at the DOE laboratories. There will also be: a traveling museum-based science education program consisting of exhibits on major energy-related scientific programs; increased precollege science teacher research appointments and minority high school student appointments to encourage more students to stay in the math/science pipeline; and emphasis on reaching students at a younger age, especially women and minorities, through the Prefreshman Engineering Program.

Two collaborative initiatives have already been announced that respond to this new emphasis on science education. The Chicago "Science Explorers Program" is a collaboration among ANL, FermiLab, the Chicago Public Schools, and a group of Chicago institutions involved in science education. The program is aimed at stimulating a high level of interest in science and math in 10,000 Chicago students. Another initiative is a cooperative program in math and science education between DOE facilities in Oak Ridge, Tennessee and the University of Tennessee. It will provide opportunities to college students who want to teach math or science, as well as to scientists and engineers or retirees who want to teach. A third initiative will begin this Spring and will involve the Pacific Northwest Laboratory in a collaborative science education program impacting the Hispanic and Native American populations, with another initiative expected in New Mexico using DOE facilities there.

The FY 1991 University and Science Education program will continue to provide support for refueling and related activities for university nuclear research and training reactors.

The R&D Laboratory Technology Transfer program, which supports DOE laboratory efforts to spin off new technology to U.S. industry and universities, will also continue in FY 1991. Under this program, scientists from large and small industries work on assignment at DOE laboratories with laboratory scientists. This is a valuable interaction because new skills and technology are transferred on a timely basis through cost-shared arrangements. The value of these interactions in terms of technology transfer is illustrated by the fact that, in the last five years, DOE laboratories have won over 25% of the R&D-

100 awards given annually by R&D Magazine for the best new products, processes, and materials.

UNIVERSITY RESEARCH INSTRUMENTATION

The University Research Instrumentation (URI) program provides another way to strengthen the Nation's science and education infrastructure. This program helps universities acquire the state-of-the-art instrumentation that is needed to conduct long-range research on energy problems. In the process, the program provides graduate students with hands-on experience in the use of this sophisticated research equipment. This annual, competitive program involves substantial cost sharing from the institution receiving the equipment.

The FY 1991 request of $4.9 million will assist universities in purchasing instruments that cost over $100,000 each and that will be used by a number of researchers, including students. In selecting approximately 20 proposals to be funded, special emphasis will continue to be placed on innovative instrumentation needed to carry out research on advanced topics in energy research.

MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT

The objective of the Multiprogram Energy Laboratories--Facilities Support program (MEL-FS) is to maintain the capabilities of the five national laboratories overseen by the Office of Energy Research to carry out their missions in a safe, healthy, and cost-effective manner. To accomplish this, the program supports activities that help counter problems of aging and obsolescence of facilities as well as safety and health inadequacies.

The FY 1991 Construction request of $23.7 million will support continuation of all ongoing projects. There are no new starts included in the request.

ADVISORY AND OVERSIGHT PROGRAM DIRECTION AND POLICY AND MANAGEMENT

The FY 1991 budget request for Advisory and Oversight Program Direction is $4.3 million. The FY 1991 request will provide the staffing resources required by the Director of Energy Research to carry out his responsibilities under legislation (P.L. 95-91) and those assigned or delegated by the Secretary in areas beyond the scope of other ongoing Energy Research programs. These funds are required to provide for the salaries, benefits, travel, and other expenses associated with 50 full-time equivalent employees.

The FY 1991 request for Policy and Management is $0.9 million. These funds are required to provide for the salaries and related expenses associated with 8 full-time equivalent employees in the Office of the Director of Energy Research.

That concludes my statement. I would be happy to answer questions.

BIOGRAPHICAL SKETCH

Dr. James F. Decker is currently the Acting Director of Energy Research (OER) in the Department of Energy (DOE), serving in this position since October 27, 1989. In this position, Dr. Decker serves as technical adviser to the Secretary on the Department's energy research and development programs and is responsible for the multipurpose laboratories and energy education and training activities. In addition, he manages DOE's programs for basic energy sciences, health and environmental research, high energy and nuclear physics, magnetic fusion, and the scientific computing staff. The Office of Energy Research is one of the largest basic research activities in the federal government with total funding of about $2 billion. Research is funded in DOE laboratories, universities and industry. While serving in this position, he is also the Deputy Director of the Office of Energy Research. Dr. Decker also served as Acting Director of the Office of Energy Research from April 1987 to August 1988.

Previous to becoming the Deputy Director he served as the Director of the Scientific Computing Staff in the Office of Energy Research. The mission of the Scientific Computing Staff has two parts. It funds basic research in applied mathematics related to scientific computing and, through a computer network, it provides supercomputer service to researchers in high energy and nuclear physics, basic energy sciences, magnetic fusion energy, and health and environmental research.

In addition to his responsibilities in the Department, Dr. Decker was elected Chairman of the International Energy Agency's Committee on Research and Development. He also serves as Chairman of an interagency committee on very high performance computing that functions under the auspices of the White House Science Office.

Previous to becoming Director of the Scientific Computing Staff, Dr. Decker served as a special assistant to the Director of the OER.

Dr. Decker also held several positions of increasing responsibility in DOE's Magnetic Fusion Energy program. He joined that program in 1973 as a physicist and subsequently served as Branch Chief, Experimental Plasma Research, and Director, Division of Applied Physics. As Director, Dr. Decker was responsible for all theoretical fusion research, basic experimental plasma physics research, the magnetic fusion energy computer network, and evaluation of novel fusion concepts.

Before joining the Magnetic Fusion Energy program, Dr. Decker was employed at Bell Telephone Laboratories where he conducted research in plasma physics and worked on ion implantation for integrated circuit development.

He received a B.S. degree from Union College in 1962, a M.S. degree in 1963 and a Ph.D. in 1967 from Yale University.

Dr. Decker has received several awards from the Department of Energy. He serves on a number of advisory committees within the Federal Government.

Dr. Decker was born in Albany, New York. He is married and has two children.

SUMMARY OF BUDGET REQUEST

Dr. **DECKER**. Thank you very much, Mr. Chairman. It is a pleasure for me to appear before you today to discuss the Department of Energy's fiscal year 1991 budget for the programs of the Office of Energy Research.

As you noted, these programs include high energy physics, superconducting super collider, nuclear physics, basic energy sciences, basic environmental research, energy research analysis, university and science education and supporting programs.

Our total request in 1991 is $2.7 billion, about $300 million above the 1990 appropriation. This request reflects the administration's strong belief in the key role played by science in our Nation's future technological and economic well-being.

I would like to take just a few minutes to highlight some key aspects of the energy research program for fiscal year 1991. First I would like to talk a little bit about high energy physics.

HIGH ENERGY PHYSICS

During the past year the Stanford Linear Accelerator Center and Fermilab had measured certain key features of the so-called standard model. The measurements made at both laboratories on the Z particle have confirmed the prediction of the standard model by setting limits on the number of different species of fundamental particles.

The search at Fermilab for the elusive top quark predicted by the standard model continues and a lower limit on its mass was established.

Senator **JOHNSTON**. Is that CHARM?

Dr. **DECKER**. That is top quark.

Senator **JOHNSTON**. Was its name CHARM?

Dr. **DECKER**. No sir; the top quark and the quark known as CHARM are different.

The higher energies that are required to continue the search are only available at Fermilab. The 1991 budget request provides for full operation of our high energy physics facilities at Fermi, SLCA, and Brookhaven.

SUPERCONDUCTING SUPER COLLIDER

Next, I would like to talk about the status of the superconducting super collider [SSC]. There are a number of important fundamental questions about the standard model that cannot be answered using present facilities here or abroad.

To reach the energy necessary to answer such questions, we need to build a machine capable of reaching much higher energies, the SSC. Just 12 months ago we began creating the SSC laboratory from a true green field start.

One of the first tasks of this new laboratory group has been to complete a new base line conceptual design for the Texas site.

You may recall that the original conceptual design completed in 1986 was developed by a national design team located at the Lawrence Berkeley Laboratory. The preliminary baseline design completed by the new laboratory in January of this year contains two important technical design changes based on new information since the original 1986 design was completed.

The injector which sends protons into the main 54-mile ring had to be enlarged to inject the protons at 2 instead of 1 trillion electron volts and the magnet aperture had to be increased from 4 to 5 centimeters.

These technical design changes, which became clearer only this fall, have led to significant increases in the estimated cost of this project.

MAGNETS REDESIGN

Senator JOHNSTON. Now, the redesign of the magnets is caused by the additional voltage required?

Dr. DECKER. No; the two are not linked, the increased injection energy and the increased magnet aperture.

Senator JOHNSTON. Well, what I am getting at is that the redesign of the magnet is necessary because of other requirements not because the magnets themselves did not function properly.

Dr. DECKER. That is correct.

Senator JOHNSTON. And how is the redesign of the magnets coming along?

Dr. DECKER. We have just started on that redesign. We have put together, I think, a top-notch team headed by Bob Palmer, who is from Brookhaven. He will be heading it up, and we are starting into that redesign effort. We expect to do some of the initial 5-centimeter magnets at the Fermi National Laboratory where we are best equipped to put the first ones together.

We expect to have a 1.8-meter, 5-centimeter magnet completed by the end of this year, and the full length one will be completed in the spring.

Senator JOHNSTON. Of next year?

Dr. DECKER. Of next year, that is correct.

Senator JOHNSTON. And that will be done at Fermilab?

Dr. DECKER. Yes; that is correct.

Senator JOHNSTON. Initially the plan was to do tunneling with last year's money, the $25 million. Now, you have said the tunneling will not begin until the magnets are redesigned?

Dr. DECKER. That is correct.

Senator JOHNSTON. So when would you expect tunneling to begin? At what point do you consider the design to be fixed so that you can do the tunneling?

Dr. DECKER. I think we have to show that we can build these magnets in industry. We will be getting our industrial contractor on board this fiscal year——

Senator JOHNSTON. Say again? Excuse me, I did not hear what you said.

Dr. DECKER. We will be getting our industrial contractor on board for the magnet program this fiscal year.

MAGNET INDUSTRIALIZATION PROGRAM

Senator JOHNSTON. What does that mean, "getting him on board"?

Dr. DECKER. It means that we eventually plan to have these magnets manufactured in industry, because there is a requirement for such a large number of them.

Under phase I of the magnet industrialization program, we have brought in a number of companies to familiarize them with the technology. Now, we need to move on to phase II where we bring in industrial contractors to actually get involved in making prototype magnets.

Senator JOHNSTON. Is that what you mean when you say you are getting them on board, that you will let contracts for phase II?

Dr. DECKER. That is correct.

Senator JOHNSTON. Phase I is being done at Fermilab?

Dr. DECKER. Phase I is a familiarization for industry of the superconducting magnet technology that we have developed today in the various laboratories—Brookhaven, Fermilab, and Berkeley.

Senator JOHNSTON. That is phase I?

Dr. DECKER. Yes; and that is essentially completed.

Senator JOHNSTON. And when will you be letting contracts for phase II?

Dr. DECKER. We would hope to go out on an RFP sometime this spring. I do not have a date for you as to when we would have a contractor on board, but certainly before the end of this fiscal year.

Senator JOHNSTON. You say the spring, and then you say before the end of the fiscal year.

Dr. DECKER. I would hope that we would release the solicitation in the spring and have the industrial contractor on board sometime before the end of the fiscal year.

Senator JOHNSTON. When you go out, you are just going out for a sample. You are not going out with all 10,000 magnets?

Dr. DECKER. That is correct; the manufacturing stage is phase III.

Senator JOHNSTON. Phase II would be what?

Dr. DECKER. Having industry develop the tooling and make the prototype product and low production rate magnets.

Senator JOHNSTON. How big are those?

Dr. DECKER. To show the fact that we can produce them, at least in small numbers and improve the manufacturing process over about 800 magnets.

Senator JOHNSTON. Is this accommodated by this budget here?

Dr. DECKER. Yes; it is.

Senator JOHNSTON. How much do you figure your contract for phase II magnets would be?

Dr. DECKER. I do not have that number in my head. I can supply it for the record.

[The information follows:]

FUNDING OF SSC MAGNET INDUSTRIALIATION PROGRAM

The preliminary estimate of the total cost of Phase II of the SSC Magnet Industrialization Program is $313 million (FY 1990 dollars). This includes $193 million (FY 1990 dollars) for the engineering development of the magnet and manufacturing process, the production of 15 prototype magnets, the subsequent production of 100 pre-production magnets, and the testing and evaluation of performance of these magnets. The estimate also includes $120 million (FY 1990 dollars) for the final element of Phase II which consists of low-rate production of 781 magnets in an industrial environment using the final tooling process.

The preliminary estimate of the cost of Phase III, procurement of 7,200 dipoles, is $900 million (FY 1990 dollars).

MAGNET INDUSTRIALIZATION PROGRAM

Senator JOHNSTON. Is it a large part of your budget request?

Dr. DECKER. Yes; a large part of the construction funding does go for the magnet industrialization program, but I do not have the exact amount.

Senator JOHNSTON. All right. Then when would you be ready for phase III?

Dr. DECKER. A string test of the magnets will be conducted in September 1992 followed by the manufacture of the preproduction magnets. I believe that phase III starts some time in fiscal year 1995.

Senator JOHNSTON. Sometime after September 1992?

Dr. DECKER. That is what I recall, but I would like to supply a schedule of the milestones for the record.

[The information follows:]

Schedule dates for SSC magnet industrialization program

Planned phase II milestones:	
Contract award	2/92
Start prototype deliveries	3/93
Start low-rate production deliveries	5/94
Planned phase III milestones:	
Qualification of second source	6/94
Start high-rate production	5/95
Complete high-rate production	5/98

Senator JOHNSTON. Now, your tunneling begins after, at the sort of coterminus, or coincidentally with the beginning of phase II, or the end of phase II and the beginning of phase III?

Dr. DECKER. I think we will have demonstrated that we can produce these magnets in industry when we do the string test in September 1992. The string test will occur during phase II.

SSC FUNDING PROFILE

Senator JOHNSTON. So as far as our budgetary planning here, you are not going to have a spike in your budget request to this committee until fiscal year 1993, would you say?

Dr. DECKER. Well, we have to relook at the funding profile, given the fact that we do have changes in the project and we do not have a new funding profile for you at this time.

Senator JOHNSTON. I know you do not have a funding profile, but if phase II magnets did not start until September 1992 and tunneling does not start until the same time—or does phase II involve a lot more money than you have here?

In other words, we have $318 million in the 1991 budget, up from $218 million last year, just in round numbers, and we will not hold you to this, but fiscal year 1992 should be around the same amount? Is that correct?

Dr. DECKER. No; it goes up. It is about $570 million in fiscal year 1992.

Senator JOHNSTON. About $570 million for next year. Is that because of phase II, principally?

Dr. DECKER. Yes.

Senator JOHNSTON. Please proceed.

TECHNICAL DESIGN CHANGES

Dr. DECKER. I was talking about these technical design changes which just became clear this fall, and they have led to significant cost increases. There are some additional cost increases.

Senator JOHNSTON. Let me ask one more question. Relating to phase II, do you foresee a single source or multiple source?

Dr. DECKER. That is something that is still under discussion in the Department. We have not made a decision on that yet. The laboratory has proposed a scheme that is really a single source, in phase II, but we still have that under discussion.

Senator JOHNSTON. If you go single-source phase II, is that somewhat like single-source phase III?

Dr. DECKER. The scheme has the provision of bringing along another company such that you can have two companies that can manufacture in phase III.

Senator JOHNSTON. So you have competition?

Dr. DECKER. You can have competition with the laboratory's scheme within phase III.

Senator JOHNSTON. So you would probably effectively have more than one contractor in phase II?

Dr. DECKER. In a sense, yes, because you have to bring another contractor along and make sure that he has the technical capability to be a player.

Senator JOHNSTON. While you are waiting for your next issue, let me reiterate what I have said many times before, and that is I do not think we ought to give away the high technology part of SCC. If you want to get the Congress really upset, it would be by giving away the high-technology aspects of this project.

If DOE wants to give some work, let them help us dig the ditch out there, but do not give away the—I mean, that is why we are undertaking this project—to learn how to do the high-tech activities, as well as to learn the secrets related to the structure of matter. So let us not give that away. Please proceed.

COST INCREASE

Dr. DECKER. Getting back to the cost increase, which we believe are in the $1 to $2 billion range above the $5.9 billion, about two-thirds of the increase is due to technical design changes. Over the next few months, the laboratory will continue to refine its design and associated cost schedule estimates. The Department will then conduct two independent reviews of the laboratory's work and we will have a new validated cost estimate this summer.

Recently Secretary Watkins, Deputy Secretary Moore and I met with White House Chief of Staff John Sununu, OMB Director Richard Darman, and the President's Science Advisor, Dr. Allen Bromley, to discuss the project's status and plans. The result of that meeting was a reaffirmation of the administration's strong support for proceeding with the super collider as planned. In fiscal year 1991, the primary emphasis on the project will be on design and magnet development.

NUCLEAR PHYSICS

Next, I would like to talk a little bit about nuclear physics. The nuclear physics program seeks to understand the behavior and structure of the nucleus. While there are many important activities, I will only mention one: the proposed relativistic heavy ion collider at Brookhaven. We are requesting $15 million to start construction of that project.

When the relativistic heavy ion collider is operational it will be possible for the first time to study nuclear matter in extreme conditions of high temperature and density. At these extreme conditions, a new state of nuclear matter, a quark gluon plasma, can be studied for the very first time. This is a state of matter that scientists believe existed at the beginning of the Universe, shortly after the Big Bang.

MAGNETIC FUSION PROGRAM

I would like to talk just a few minutes about the magnetic fusion program. Fusion promises to be an attractive source of energy for several reasons: fuel availability, lower radioactive waste, and safety.

I am encouraged by recent progress in fusion research both in the United States and abroad. Conditions required for energy break-even have nearly been achieved at both the TFTR in Princeton and Europe's JET experiment. A demonstration that pressure required for a reactor could be contained in a magnetic field of a tokamak was achieved on Doublet III at General Atomics.

Working cooperatively, the United States, Japan, and the Soviet Union recently completed an interim conceptual design report for an engineering test reactor, called the international thermonuclear experimental reactor.

Taken together, I think these accomplishments and others described in my written statement indicate significant progress toward practical fusion energy.

Given the potential importance of fusion energy for meeting the Nation's energy requirements, Secretary Watkins felt it was prudent to review our development strategy. The Secretary has formed an independent fusion policy advisory committee to carry out a high-level review of fusion over the next few months.

This review will recommend to the Department a fusion policy for both magnetic and inertial confinement programs. The review will be completed in September, and we will very carefully consider the committee's recommendations.

For fiscal year 1991, it is my intention to maintain the current magnetic fusion program balance with a focus on confinement physics. When the review is completed in September, the program plans and budget estimates will be revised as necessary.

BASIC ENERGY SCIENCES

Next, I would like to talk a little bit about basic energy sciences. In addition to supporting research over a wide range of technical areas, the basic energy sciences program funds the operation of major facilities, such as synchrotron radiation sources, neutron sources, and the combustion research facility, which are used by both industrial and academic researchers.

I would like to mention briefly a major synchrotron light source construction project that was started in fiscal year 1990 for the 6 to 7 GeV hard x-ray light source at the Argonne National Laboratory, for which we are requesting $75 million in construction. This third-generation facility will provide brilliant x-ray beams unavailable elsewhere in the world.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

Next, biological and environmental research. The Department of Energy takes very seriously its responsibilities to understand and anticipate long-term health and environmental consequences of energy development and use. The biological and environmental research program conducts research just for this purpose.

HUMAN GENOME RESEARCH

I would like to highlight two elements of our proposed fiscal year 1991 program, the human genome program and global climate change.

The human genome program, carried out jointly with NIH, is aimed at characterizing the genetic material in the human cell and is the first large-scale integrated program in biological research.

The Department's portion of the program, for which we are requesting an increase of $19.9 million in fiscal year 1991, focuses on developing analytical and computational resources to develop better ways to physically manipulate large fragments of DNA.

Senator JOHNSTON. I understand there has been a breakthrough in genome research, so that you can categorize it better or more quickly or more efficiently do it; is that correct?

Dr. DECKER. Well, there are several developments which have occurred that look very promising. There is a new approach to physical mapping, which has been developed, and looks like it could speed up that process.

There are also technology developments coming along that may allow us to sequence the genome using physical techniques, as opposed to the biological techniques which have been used in the past. Hopefully, that will make sequencing the human genome much less expensive and much quicker.

The National Institutes of Health effort on the genome program is oriented toward characterizing disease-oriented genes through the use of both human and nonhuman model systems.

GLOBAL CLIMATE CHANGE

The issue of global climate change must be an important component of a national energy strategy. Our carbon dioxide research program is the principal department activity in the U.S. global change research program, coordinated by the Office of Science and Technology Policy.

With the 1990 appropriation we have launched a major research initiative to provide the scientific underpinnings for prediction of global and regional climate change. The principal component is an experimental program to quantify cloud formation processes and the role of clouds in climate change. This is a major uncertainty in present climate models.

Senator JOHNSTON. Dr. Decker, you are familiar with the various climate change initiatives that are going on in the Congress. I asked your predecessor about global climate change, and he said, in effect, that at least the initial spate of experts who testified, certainly the Energy Committee, that the connection between global warming and CO_2 in the atmosphere, the greenhouse effect, was not nearly so clear as those experts were saying.

What is your current view on global climate change?

Dr. DECKER. I would agree with that statement. There are some very large uncertainties in the models. For example, the coupling of the oceans to the atmosphere. The heat capacity of the first 2 meters of the surface of the ocean is the same as that for the entire Earth's atmosphere. So the ocean itself is an enormous heat sink.

And how it couples with the atmosphere, for example, is just not very well understood. The whole issue of clouds, which is part of the Department's initiative in 1990 and 1991, is extremely important. Because it has—the effect of clouds has a big effect on the radiation balance between the surface of the Earth and the top of atmosphere. nd that is a very key part of the models.

So, in my view, those are just two examples of large uncertainties.

Senator JOHNSTON. And where are all these experts going wrong? Do they not look at the same data you do, or do they interpret it differently?

Dr. DECKER. Well, from my experience, people who have computer models that they deal with sometimes lose track of the uncertainties that are built into those models. One starts to believe models, when there are unfortunately still major unsolved questions associated with them.

I think I have pretty much covered global climate change, or you have helped me cover it.

SCIENCE EDUCATION

I would like to complete my remarks by mentioning our strong commitment to science education. We will continue to use the unique resources of our laboratories to expose both teachers and students to the excitement of frontier research. Our primary emphasis is shifting to focus more of our activities on the precollege level, and women and minorities, where there is a real crisis in this country.

We are simply losing too many students from science and math at an early age.

And that complete my remarks. I would be glad to answer any questions.

UNIFIED SCIENCE BUDGET

Senator JOHNSTON. Dr. Decker, there has been some discussion, and I have urged that we have a unified science budget, not that we have one committee, but that there ought to be one place where all science, all R&D is considered. In that way we could have some sensible idea about how to prioritize.

We speak of the SCC, the space station, the National Science Foundation, and yet we never make any attempt to categorize or prioritize these initiatives, or indeed, all the other initiatives, save those that come before one committee. And we have to, therefore, prioritize between the SCC and the human genome, and those other programs which you have mentioned here today. But we ought to get all of them together.

I had understood that the administration was going to try to submit such a budget. What is the status of that?

Dr. **DECKER**. I am not familiar with what the administration might be doing in terms of submitting that type of budget. I know that Dr. Bromley in the Office of Science and Technology Policy is working very hard to reactivate the whole Federal Coordinating Council on Science, Engineering, and Technology. That is the body within the administration that has the responsibility for coordinating science across the various agencies. I think that Dr. Bromley is in the process of really turning that into a very effective organization.

I think that does not get directly at the question that you asked, but I think it is an important step forward in coordinating science across the government.

BUDGET PRIORITIES

Senator **JOHNSTON**. Then would you tell me what your top three priorities are in this budget? I know you do not like to make choices, but I could ask it another way and say the bottom three.

Would you give me your top three?

Dr. **DECKER**. That is very, very difficult. The reason that it is so difficult, to me, is that from my observations it has been very important to try to move forward to continue to push the frontiers of our knowledge in all areas of science, and basically that is what we are trying to do. The SSC is obviously going to be necessary toward the end of the decade in pushing forward our knowledge in high energy physics.

The genome project is obviously very, very important to moving forward in the areas of human health and understanding the effects of various pollutants and so forth on human health, so that is a very important item.

One can go through and sort of make similar statements about so many areas within this budget.

MAGNETIC FUSION PROGRAM

Senator **JOHNSTON**. I am, frankly, looking at the magnet fusion program, as we have to save money. It just seems to me that $325 million, considering the state of that program, frankly, is like a lot of money.

Would you want to defend that figure?

Dr. **DECKER**. Yes. I believe that fusion can be a very important energy source for this country, and I think we need to continue to look forward to try to develop that source. From talking with Secretary Watkins, I believe that he sees fusion as being a very important part of the national energy strategy for the future.

I think we need to maintain at least that level during the coming year to have a viable program. That program has been cut back very substantially over a period of years. I think in real dollars it is probably nearly one-half what it was in its peak year if you counted inflation.

Senator JOHNSTON. What is the status of the Princeton Tokomak, the TFTR? They have not put the fuel in the reactor. Why is that?

Dr. DECKER. We have not moved forward with burning deuterium and tritium in TFTR. We have been using it quite heavily to do studies to understand energy transport in Tokomaks. That is one of the best diagnosed Tokomak facilities in the world for that purpose.

Senator JOHNSTON. I may have some additional questions, but as we have to find money I can tell you that is one place we have to look at very carefully.

Senator Hatfield will preside for the rest of the hearing.

So I want to thank you, Dr. Decker.

I think Senator McClure arrived first, so he will ask the first questions.

BORON NEUTRON CAPTURE THERAPY RESEARCH

Senator McCLURE. Thank you very much.

I followed with a great deal of interest the questions that were asked. Of course, the breadth of the activities of the Department of Energy is so stupendous that we could be here all afternoon talking about any one of several hundred different issues. Each one of us will highlight one or another or a half a dozen of activities.

I will take the time of the committee only to develop one because of particular interest that I have but also because I think it has fallen between the cracks somewhere, and I want to lift it out of the cracks; and second, because in going through your statement I see a great deal about many of the other issues, but I do not see much about this one, which also indicates to me it has fallen in the cracks somewhere.

Let me go through a list of what I think I know, and I hope you will check it off and tell me where I am wrong or if you disagree with what I think I know. I am talking about the Boron Neutron Capture Therapy [BNCT] Program.

I am aware that for scheduling and economic reasons researchers at the BNCT programs selected the Brookhaven reactor as the neutron source for initial BNCT animal brain tumor research.

I am aware that the Idaho researchers designed, built, and in collaboration with researchers at the Brookhaven National Laboratory, installed the neutron transmission filter in the Brookhaven reactor.

I also believe that the Idaho brain tumor treatment research using the Brookhaven neutron beam and dogs with naturally occurring brain tumors similar to those occurring in man is achieving good boron concentrations and has shown dramatic tumor control, control not achievable with any other treatment modality.

I am aware that the neutron beam purity achievable at the Brookhaven reactor will severely limit the radiation dose that can be delivered to human tumors because they are deeper in normal brain tissue than the dog tumors treated so far.

I believe that the MIT/Tuft's BNCT research that you have been funding for the last 2 years has now demonstrated that the MIT research reactor is not suitable for the treatment of deep human tumors with any known boron drug.

I am also aware that the Idaho BNCT program is not just an Idaho program. I use that label only to conveniently label it. It is a comprehensive national program with active participation by researchers from the University of Washington, Washington State University, UCLA, Oregon Health Sciences University, Idaho State University, the University of Utah, Cornell, and several other entities.

Furthermore, the Biomedical Advisory Committee that guides the Idaho research includes the leading U.S. researchers in all related fields and because of the Idaho program's internationally recognized technical accomplishments, three of the Idaho program leaders have been elected to the board of governors for the International Society for Neutron Capture Therapy.

Now is there any part of that recitation with which you would take exception or desire to make a correction?

Dr. DECKER. There is nothing that I would take exception with, since there are several things that you mentioned that I am just not familiar with.

Senator MCCLURE. OK. If you are not familiar with them, you might make a note, and if you find some reason to tell me that the information I have is incorrect, please let me know.

Dr. DECKER. I am just not up on the latest information with regard to the dog experiments.

Senator MCCLURE. I do not want to be misled, and I do not want to mislead anyone else if I do not have good information.

In view of the international BNCT research lead achieved by this program and the clear superiority of the Idaho PBF reactor for human tumor treatment, why does your fiscal year 1991 budget request not support continuation of this program?

Dr. DECKER. The fiscal year 1991 budget request does request funds to continue the BNCT program.

Senator MCCLURE. But not the research at the Idaho facility, not the Idaho portion of the research. It supports Brookhaven. It supports continuing the power burst facility in standby condition, but it terminates important aspects of the Idaho activity.

Dr. DECKER. I believe that there is still research planned at Idaho. I think the confusion may be that the money that was going to researchers outside of Idaho at universities and so forth will be funded directly out of DOE headquarters rather than through the laboratory.

Let me just mention that this whole program is under review at the present time by a subcommittee of the Health Environmental Research Advisory Committee. They have presented a draft report to the full committee, and because of comments from the full committee they are going back to do some rewriting. I am not sure what the due date is. I think it is fairly soon now.

Senator McClure. I would be interested in that process as well as the results of that process.

I would also like the opportunity to at some point, in some way, plug into the process so that I may know what my information is and also test the information which they are using.

Dr. Decker. OK; that is fair.

Senator McClure. As I understand it, the DOE/NCI research focus since the beginning of this program has been the drug used in the Idaho program which was developed 25 years ago, and that so far there is no other drug that has demonstrated any superiority, although there are some who are now saying, hey, this drug will not do what needs to be done, let us wait until we find something new.

Dr. Decker. That is correct. My understanding is that there is not now a good enough boron compound in many people's view, that there is not sufficient concentration of the boron compound in the tumors, and there is too much that either remains in surrounding tissue or in the blood and blood vessels.

Senator McClure. You indicated a moment ago you really were not up to date as to what was being done right now, and I do not mean to press that issue at all.

EUROPEAN BNCT RESEARCH

Are you aware that the collaborative European BNCT research program reviewed the near-term treatment options this winter and they selected the same boron drug that has been used in the Idaho experiments and that the Europeans are preparing to modify a reactor that is not as good as the PBF and to have it on line using this boron compound that you are apparently advised is not good enough?

Dr. Decker. When I say it is not good enough, what I have heard is it is not good enough to start the preclinical trials.

No; I was unaware of the European findings, and I would be interested in that.

Senator McClure. Are you aware that they have treated a number of dogs with tumors using this drug?

Dr. Decker. Yes.

Senator McClure. And that the treatment has been successful?

Dr. Decker. I am aware that experiments are being done on dogs, but I do not know what the results have been. The last I heard, I guess, was that the number of dogs treated was pretty small.

Senator McClure. It is small in number. Two dogs died. One was too far gone before they got to him, and the other died from the anesthesia. Of the dogs which were treated and lived, the imagery of the tumor is without exception exciting and dramatic following treatment.

Dr. Decker. The purpose of this advisory committee will be to look at all of those results and to provide recommendations for a future program.

Senator McClure. As I understand it, the Idaho program participants submitted in December 1988 a recommendation and a comprehensive program plan to expand their research to include melanoma, and your Department has not yet reacted to that recommendation.

Can you tell me why after this length of time and the apparent successes of treatment that there has been no reaction?

Dr. DECKER. I am unfamiliar with the history of that particular proposal. I will be glad to look into it for you.

[The information follows:]

STATUS OF BORON NEUTRON CAPTURE THERAPY OF MELANOMA

The proposal to expand the Idaho program to include a melanoma treatment evaluation program was reviewed within the Office of Health and Environmental Research. The program was not funded because related work was already underway at other laboratories and because with a major review of the Idaho National Engineering Laboratory program being planned it seemed inappropriate to initiate a major expansion of the program before the review was completed.

TREATMENT OF MELANOMA

Senator MCCLURE. There was some concern as to whether or not the BNCT program should be expanded to include the treatment of melanoma, but, as I understand it, some of the medical experts objected to the use of the treatment because where BNCT has been used successfully in the treatment of melanoma they have been surface tumors, and the medical community reaction was there are other ways to take care of surface tumors. They remove them surgically; therefore, you do not need to go to the trouble of developing something as dramatically different and as expensive as this kind of treatment. I can understand that criticism.

If it were only the surface melanoma that we were talking about, I might well agree with them. When you talk to the radiation oncologists, however, they are quick to point out that melanoma does not always occur simply at the surface. They also become deepseated. At this time we have no known way of treating the deepseated melanoma with BNCT treatment even though we know it is successful against surface melanomas, and that probably the only way to get at those deepseated melanomas with this kind of therapy is to use the PBF, the only known source of neutrons that are suitable for the treatment of deepseated tumors.

I am concerned that while we delayed earlier, which delay I supported, to test the cobalt compounds further to make certain that, indeed, we did know what their concentration and dispersion rates were, now that we have found that the concentration rate and dispersion rates are successful we are still trying to find some other reason not to move forward with the program.

The successes in Japan are dramatic. Let me put it this way. The reaction of the European consortia to the successes we have had in the programs in this country do not match our own. The Europeans are ready to move forward. They are taking the compounds we have developed, the experience we have developed, they are getting ready to modify a reactor which admittedly will not be as good as the PBF but better than anything we have in this country at this time, and they are going to go ahead and start treatment as soon as they can get that reactor ready.

We have a reactor which, again, requires conversion, but we are not even moving forward to convert that reactor until we can be more sure, we are being told. I am puzzled in my own mind to know just exactly why this is. I guess I put that against a background that I cannot explain.

As I understand it, a couple of members of your staff, Drs. Robert Wood and James Robertson, actively prohibit any meaningful news releases to the public on the successes of this program.

Are you aware of that?

Dr. DECKER. No; I have never heard that.

Senator McCLURE. Specifically, they prohibited use of a poster and a brochure to inform patients and family members during a brain tumor patient support meeting held in February in San Francisco.

I cannot understand why you would actively prohibit the dissemination of information that might bring some hope to these patients. Would you have any explanation?

Dr. DECKER. I did not see the material, so it is hard for me to comment on it.

Let me assure you that we have supported BNCT for some period of time——

Senator McCLURE. Yes, sir; I know that, and I am aware, and I am grateful.

Dr. DECKER. We obviously hope it will succeed, and we have no intention to hold it back.

The one thing that is a concern, as has happened in the past in the early days of BNCT work, there were trials that started prematurely and, unfortunately, caused damage to the program because of that. We surely do not want to see something done prematurely that would cut off research that eventually might, in fact, be successful. So I think that is one reason for our caution.

As I said, this review which is being carried on now I think will provide both you and I with a much better picture of the current state of the research.

Senator McCLURE. Yes, sir; and I appreciate that. I am aware of the former failure and the concerns that many have expressed, that we cannot stand another such failure.

Dr. DECKER. Right.

BNCT RESEARCH IN JAPAN

Senator McCLURE. I certainly do not disagree with you on that. I think we must be careful.

At the same time, Dr. Hatanaka in Japan has been using this kind of therapy on brain tumors in a much more dramatic procedure and an invasive procedure with much greater damage to the patients and much greater risk to the patients than any that we would contemplate in this country in our programs. Dr. Hatanaka also has used it to successfully treat the superficial melanomas, and he needs only a better neutron source to proceed to the treatment of deepseated melanomas according to his statement, his research, which is corroborated by the review of our experts in looking at his research program.

Dr. Hatanaka in Japan has treated over 100 brain tumor patients with the treatment of the relatively rudimentary sources of neutrons that are available to them from other sources.

I think we have reviewed those cases, and those cases by Dr. Hatanaka in particular have been remarkable in the success ratio with the available boron drug. His surviving patient cases have been reviewed in depth by several U.S. medical authorities such as Dr. William Sweet at Massachusetts General, a Harvard neurosurgeon, and Dr. Patrick Kelly of Mayo Clinic, again a neurosurgeon, and they feel that they are very, very encouraging.

Yet, when I get to the Department of Energy I find reaction quite to the contrary. You tell me it is under review. I accept that it is, but I am very, very perplexed, indeed, when other people, the Japanese, our own medical experts, outside DOE and this country and outside NCI, incidentally, and outside the existing places such as Brookhaven are very, very optimistic; however, within DOE I find what to me is inexplicable resistance toward moving forward.

As I recall, the only reason we did not move forward with modifying the power burst facility was because of the cost, and yet we agreed at that time to pay the cost of standby of the unit, and we have been paying that cost for several years.

I do not criticize that. I participated in it. And yet if we had started at the outset of this program to put that money into the conversion of the unit, it would now be converted, and all we have gotten with the expenditure of the money is continuation of standby.

I am convinced unless there is something else that can be supplied in terms of technical information, I am convinced that it is time for us now to stop spending the money just for standby and put the money into the conversion of the power burst facility, so it would then be, in 2 or 3 years, in a position for us to begin the treatment of patients unless something else happens between now and then to indicate that indeed we have made a bad judgment.

I do not think it is a very high risk venture on our part to take that step now, and I look forward to talking with you further and to others within the Department of Energy to see if maybe we cannot arrive at the judgment collectively. I would certainly like your support on it.

Thank you, Mr. Chairman. I do have some other questions which I can submit for the record, not on this subject, but on others.

Senator **Hatfield** [presiding]. Thank you, Senator McClure.

Dr. Decker, I would like to associate myself with Senator McClure's comments as I was briefed on this matter through the Oregon Health Science University's role only this last week.

STATEMENT AND QUESTIONS SUBMITTED ON BEHALF OF SENATOR SYMMS

Dr. Decker, I would like to include in the record at this point a statement by Senator Steve Symms of Idaho and some questions on his behalf.

[The statement and questions and answers follow:]

Statement of Senator Symms

I believe that the Boron Neutron Capture Therapy (BNCT) represents an amazing opportunity to cure brain gioblastomas

A reactor in standby in Idaho could provide the missing link in a 20 year research effort to find a cure for malignant brain tumors. The Idaho National Engineering Laboratory, a DOE national laboratory, is trying to establish a national program that would combine this research with a treatment program that could save over 7,000 lives a year in the United States alone. A relatively small amount of money has delayed the startup of the program. If this BNCT treatment were in place today, CIA Director Casey's cancerous brain tumor might have been destroyed with one or two five minute treatments.

The program is directed initially towards a specific tumor type called the glioblastoma multi forme, for which there is presently no cure. Available treatments are always unsuccessful, and tens of thousands die each year from this cancer all over the world.

The BNCT treatment involves injecting the patient with a boron compound, which is selectively absorbed by cancer cells. The area of the tumor is exposed to a neutron source from a reactor. The boron and the neutrons interact, disintegrate and the fragments kill the cancer cells, leaving the healthy surrounding cells undamaged.

For over 20 years, Brookhaven Laboratory has conducted research on the boron compounds that would be used, but available sources of neutrons—in this country and in the world do not produce neutron beams intense enough to make the treatment practical.

More than eighty experiments into the BNCT program have been conducted by a physician in Japan, in a treatment that requires the patient to lie in front of a reactor heavily sedated, for 10 to 12 hours at a time, with skull open and brain exposed. Some of Doctor Hatanaka's patients have apparently been completely cured.

The INEL reactor, called the Power Burst Facility (PBF), would not require opening the skull to the neutron source, and each treatment would take 7 to 10 minutes each. Researchers there believe the vital and missing link in this cancer therapy is the PBF, a reactor unlike any other in the world in its capability to produce high intensity neutrons. These neutrons and the way in which they would interact with the boron compound are the key to the future of this cancer treatment.

Owned and operated by DOE for the Nuclear Regulatory Commission in the late 1970s and early 1980s, as part of the NRC's nuclear reactor safety program, PBF was put in standby early in 1985 and it is slated to be decontaminated and decommissioned.

However, funding is being sought for the minor modifications that must be made to PBF to make the beam easily available and for some animal and chemical studies. If less than $10 million were made available in the fiscal year 1991 Budget now for modification and operation, cancer treatment could begin within two years.

Medical and scientific support for the BNCT is growing, with the National Institute of Health, Brookhaven Laboratory and Washington State University all becoming involved. Services volunteered by the Hospital Corporation of America and physicians at the Eastern Idaho Regional Medical Center for cancer screening, treatment and follow-up care total more than $1 million.

All that is holding back this program that could save 7,000 lives a year is want of a moderate amount of money to modify the PBF so that tests with the special neutrons that PBF can create can begin.

I am distressed by several new criticisms of the program that are emerging that seem unwarranted to me. I would like to address ones that I have heard in this short statement.

First of all, I am beginning to hear gripes about the boron compound being used in this therapy. Arguments are made that too much damage is caused to nearby healthy tissue even though the cancer tumor is obliterated. The logic of this is absurd. People who make this argument most certainly have a peculiar notion of the Hyppocratic Oath. These naysayers would let someone die rather than try an experimental treatment that might cause some damage to surrounding brain tissue.

Another argument against BNCT is that there are better experimental treatments that the Department of Energy should spend its money on that hold more promise for success. My question for those who take this press release oriented approach is, "How do you measure success?" Energy beams that can destroy skin cancers and eye cancers are given priority over the BNCT brain cancer therapy under this "success assessment" approach. That is not acceptable to this Senator. Clearly, in my opinion, glioblastoma multi forme therapies should be given higher research priority than this. These tumors threaten lives, not just eyesight or completion.

Yet another silly argument against pursuing modifications to the Power Burst Facility is that people just won't travel to remote sites to submit themselves to the latest experimental treatment for curing cancer. Perhaps people that throw this argument around can explain for me why people are travelling from all over the world to Japan and undergoing the 10–12 hour treatment there. Perhaps they can also explain why the European Community is now initiating a program to build a facility nearly identical to the Power Burst Facility in either Britain or Germany so that information they have learned from DOE research can be applied to a major boron neutron cancer therapy program for Europe.

Few issues have puzzled me more than the imaginative arguments by the National Cancer Institute and others that have emerged during recent debate related to the BNCT therapy. I will not claim that NCI supports the barbaric and poisonous practice of chemotherapy over new research therapies such as BNCT, but many folks in my home state are. I think those kinds of claims are made by frustrated people who would like to see a break through in brain cancer treatment so that more lives can be saved. They are frustrated by the lack of support by the Department of Energy for the BNCT Program.

Researchers at INEL are confident that human trials for BNCT can begin within 24 months. I don't know who you believe, Mr. Decker, but I believe the researchers, clinicians, and radiological oncologists in Idaho. I honestly do not believe that these scientists would make assertions that they could not back up. If this is the case, I feel strongly that the 101st Congress must act to initiate modifications to the Power Burst Facility as soon as possible.

QUESTIONS SUBMITTED BY SENATOR STEVE SYMMS

POWER BURST FACILITY

Question. Are there arguments that I am not aware of against this Congress proceeding with authorization and dollars to modify PBF?

Answer. While it is true that a great deal of progress has been made in the physics associated with production of an epithermal neutron beam suitable for use in Boron Neutron Capture Therapy (BNCT), and that the Idaho National Engineering Laboratory (INEL) has been effective in developing the design of the beam-filter that is now in use at the Brookhaven National Laboratory Medical Research Reactor (BNL-MRR), the overriding obstacle to recommencing BNCT at this time is not so much the physics, but problems involving other factors. In particular the lack of adequate boron compounds, the lack of knowledge concerning the pharmacology of available compounds, microdosimetry questions, and unknown aspects of the radiobiology of the boron/neutron interaction and the effect of particle and photon radiation injury in non-boron containing tissues are issues that have to be resolved.

Another important consideration is that experienced radiooncologists agree it will be necessary to fractionate the radiation dose by giving multiple treatments over a period of several weeks. Because lower doses will be given in any one session, this greatly reduces the advantages of higher flux that the PBF has over other reactors.

Relatively little is still known about the effectiveness of BNCT on isolated tumor cells (tumor cells imbedded in normal tissues at distances up to 9 mm from what is considered to be the boundary of a glioblastoma multiforme lesion). These cells may be responsible for tumor recurrence even though the main body of the tumor is destroyed.

The consensus in the scientific and oncological communities, both in this country and in Europe, who have examined this problem is that at least three to five more years of basic science work is necessary before resumption of clinical trials can be justified.

Question. Would the Administration recommend against such a move by Congress? If so, why?

Answer. Yes, the Administration would recommend against modification of the Power Burst Facility (PBF).

In the management of our scientific research program, we rely predominantly upon technical peer review to determine the scientific quality of proposed research activities. The proposal to modify the PBF was reviewed in February of 1988 by a site visit team assembled by the National Cancer Institute (NCI). The site visit team recommended disapproval of the plan to modify the reactor to produce epithermal neutrons for clinical trials. They did recommend that the reactor be kept in standby condition pending development of a peer-reviewed highly meritorious BNCT program at INEL which would not involve human clinical trials.

In October 1989, a second peer review was conducted of the INEL program on BNCT by the Department of Energy's Health and Environmental Research Advisory Committee (HERAC). The report is currently undergoing final review by the Committee.

In addition to these two major and substantive scientific peer reviews of the INEL program on BNCT, the Society of Nuclear Medicine and the American College of

Nuclear Physicians testified before the House Appropriations Subcommittee on Energy and Water Development on April 11, 1989 concerning the Department's medical applications research program. In that testimony, reference was made to the original NCI peer review as follows:

"The Society and College urge the Appropriations Committee to reexamine the wisdom of spending $5.3 million in fiscal year 1990, as proposed by the Administration, to keep the Idaho National Engineering Laboratory power reactor in standby while the lab improves its research proposal for boron neutron capture therapy (BNCT). There are other labs across the country that are capable of and interested in performing this type of research. Since the National Cancer Institute did not favorably review the INEL project, we question why so much federal funding is put back into the project each year. The College and Society urge the Committee to restore any BNCT funds at INEL to the base Nuclear Medicine program."

Much additional research is needed in areas such as boron compound development, boron pharmacology, radiobiology of boron/neutron interactions, and dosimetry and microdosimetry of neutron capture reactions before clinical trials should be initiated.

In view of the disapproval by the NCI scientific peer review teams regarding modification of the PBF for medical purposes and the endorsement of this judgment by two major medical societies, the administration strongly opposes expenditure of funds to modify the PBF for medical purposes.

Question. What healthy tissue damage, if any, existed in the six dogs that were practically cured by this treatment at the Brookhaven Medical Research Reactor?

Answer. The reports from the Idaho National Engineering Laboratory (INEL) indicate that nine dogs with brain tumors have been treated by Boron Neutron Capture Therapy (BNCT). Of these, four are still alive. The first of these, which was the only one in the series with a glioblastoma, was treated July 7, 1989. Two others were treated in October and one in February. Of the five dogs that died or were euthanized because of brain stem damage, autopsies were obtained in four. The reports on these do not mention normal tissue damage attributable to radiation. The brain stem damage observed in two dogs was attributed to the tumors.

Question. Are there significant differences between canine radiation tolerance and what we know about human radiation tolerance? Can tolerance ranges be measured so that radiation exposures at levels dangerous to humans can be minimized?

Answer. These questions are among the areas that require further research. The dose ranging studies that have been conducted with normal dogs irradiated without boron indicate that at the 1500-2000 rad range moist desquamation (skin damage) occurred. However, with fractionated treatments as are recommended for human clinical trials, lower doses would be delivered during each treatment session. The small size of the dogs precludes studies of tumors at the depths encountered in humans. The skin effects may have been due to the fast neutron component of the beam. In any event, further work is needed to insure prevention of this result.

DOE BENEFICIAL RESEARCH PROGRAMS

Senator HATFIELD. Dr. Decker, first I would like to compliment the agency that you represent here, the research arm of the Department of Energy. I would like also to compliment you for the leadership that you are giving to the department, particularly as it has been related to Admiral Watkins in addressing the math science deficiencies on which your Department relies heavily for such trained persons coming into the agency in the years ahead.

In some ways following up on Senator McClure, I would like to observe that we are moving into, I think, a new phase of controversy relating to the Department of Energy's research as it revolves around the super collider and fusion energy research and so forth.

I think you got a signal from my chairman today about the $300 million on that one project. I think in part, if I could make an observation, so much of the research of the Department of Energy has been clouded in the secrecy of weapons, research in weaponry and, as a consequence, the historic role that has been played by NIH and National Science Foundation and NASA and others in informing the public of the broad applications of research going on to their own daily lives has been somewhat neglected. It may not be the correct word, "neglected," but at least it has been underemphasized.

It seems to me that this is an opportunity for the Department of Energy to begin to tout the medical applications or the broad based applications of research, not as an either/or situation but it certainly seems to me that it would enhance all of your research activities to be able to portray to the public a little bit more of the research that does have great transferral possibilities and importance to them and, in part, because of some of the exciting things that are happening in medical research and how that can be ultimately applied.

I suppose my observation would be really to urge you to take a look at that particular point.

ETHICAL IMPLICATIONS OF RESEARCH ACTIVITIES

The second comment that I would like to make, and I suppose I am in a little different situation in that I do not have a parochial interest in a program going on within my State, nevertheless I do support those projects as represented by my colleagues here today.

I am deeply concerned that much of the research that is going on today at DOE, NIH, even in Agriculture that we are running pell mell into new fields of research, and quickly this is being transferred into applied research with industrial applications, and so forth. We do not often have lead time to look at the moral and the ethical dimension of what this research is producing.

I refer back to the famous book by Dr. Vandever Bush of "Modern Arms and Free Men" where he said the scientists in the laboratories have to have a better comprehension of the world in which they are placing their inventions than they have had in the past, and Dr. Bush, you know, wrote that book some years back, I think probably in the late forties.

And I am especially concerned as it involves intrautero surgery on fetuses, patenting of plant and animal tissues, studying the composition of the human DNA molecule as it relates to your genome project, that in the cycle of research how ultimately we have to face some of those issues.

I have often thought what would have happened if we had had some kind of an ethical analysis, moral analysis, $E=MC^2$—Mr. Einstein had said. [Laughter.]

I would like to ask the question: Is there in your Department, or is there in any of the agencies of Government in the fields of research, any kind of a review board, peer review and advisory committee that is looking at the ethical dimensions. I have tried to stop animal patenting for one example, not that I am opposed to scientific research. I give great support to all of it, but because I think we have to take into consideration this particular point that I am making, I asked Dr. Baltimore one day, a great geneticist, Dr. David Baltimore, what is the dimension, the ethical or moral dimension.

He said all the scientists can do is to find what they find, discover what they discover, and turn it over to society. Interestingly, society that very week as represented by Wall Street had the fastest sale of any stock for a genetic engineering company.

Now, if society is Wall Street, let me tell you, I am concerned about society receiving this kind of information of a dollar profit-driven purpose of life rather than to look at some of the more broadly important issues that do involve these interesting pieces of research. So much for my observation and question.

ETHICS IN SCIENCE RESEARCH

Dr. DECKER. Let me comment on a couple of things. First of all, I very much agree with your statement that the Department of Energy has not done as good a job as it should do in terms of publicizing the benefits of its large research programs. Part of that is due to I think what you said— part of it has been weapons-related research, and there has been a lot of very good research done on behalf of the weapons program.

The civilian side that I represent in part has not done a good job in publicizing its results, I am afraid. We are trying to do something about that. We are putting out now an annual technology transfer document which does talk about some of the great benefits that have come from research that we sponsor.

With regard to your ethics question, this is a question that I know Secretary Watkins personally is very much interested in.

Let me tell you one thing that we are doing, and I think it is a very important thing. As you can imagine, there are very important ethical questions with regard to the genome program. We do have a joint advisory committee with the National Institutes of Health that helps coordinate our two programs and give us advice, but as part of that we have a committee which is dealing specifically with the ethics question. That committee has met once. It is starting to define the range of issues that we really need to be aware of.

Senator HATFIELD. I am glad to know at least of the genesis of something along that line. I would urge you to reach out. I am sure there could be an interagency. I do not know that each agency has to have one, but I would like to see that reviewed.

I am going to submit further questions for the record because we have a vote at 3 o'clock, and I want Senator Domenici to have a chance to ask questions. Therefore, I will defer at this time to Senator Domenici.

Senator DOMENICI. Thank you very much, Mr. Chairman.

Dr. Decker, if we have to leave to go vote, I am sure it is going to be difficult for us to return. I join Senator McClure in saying that I have a number of questions and I will submit those that I do not get to ask today.

Let me first say I do not want to let any hearing of this type go by without complimenting the new Secretary of Energy. I think he is right on in almost every aspect of what he is trying to do. I look forward for the first time since I have been in the U.S. Senate to have a real policy statement with reference to America's energy policy. I think it is going to be a dramatic document. I hope it puts us on the right track to understanding America's energy dependence and to the rightful role of the Department and its researchers with reference to America's future.

MAGNETIC FUSION PROGRAM

So let me just quickly take two major, big ticket items that are in the research field very, very quickly. I am concerned about the fusion program. I am less concerned about the $325 million price tag than our chairman, and I hope that before we are finished this year he will not believe that this is one of these programs that we ought to look to to pluck to pay for some other programs.

Frankly, I want to—most of the questions on it have been asked, but let me tell you I am a bit disturbed because what happened is a premature internal decision by your predecessor about the fusion program, started a ripple here in the Congress, and it permitted a precipitous, dramatic reduction of this program by the House. You are aware of that.

Dr. DECKER. Yes, sir.

Senator DOMENICI. What they said is that the administration is going to look at this programs, let us take an axe to it, and they dramatically reduced its funding for this fiscal year.

We got a hold of what was going on, and as a consequence, the distinguished Secretary said he would put a new group in place to evaluate the magneic fusion program.

He has answered correspondence from this Senator as late as March 5 telling us essentially, I am sorry, the members of the Fusion Policy Advisory Committee have been appointed, but are not yet in place. We have lined up a great chairman, but we will not have the whole group put together in time. I am now worried because it seems to me that we expected to have some direction by the fiscal year 1991 appropriations cycle. We are not going to have that direction because the review group will not be finished with its work.

Do I understand that it is the official position of the Department of Energy that while that group is proceeding to evaluate this program that you want the $325 million budget request so we will preserve our options and not lose the fusion scientists, technology experts, and facilities while this Commission is evaluating the program. Is that a fair statement?

Dr. DECKER. That is a very fair statement, Senator.

Senator DOMENICI. Frankly, if there is anything that impresses me about the good Secretary, in addition to a myriad of things I believe he is doing well, is that I think he understands the value of research. I am very hopeful that his energy policy will be futuristic, and that he will have a bit of optimism about humankind's potential. That is why I am impressed with the fusion program.

If America and the world are looking for a source of energy that ultimately could be abundant, cheap, and clean, we ought to proceed with one of the few options the world has, and that is this fusion.

I know money is tight, but fusion using heavy water as the source of energy—and it is in abundance everywhere—if it ultimately works, is worth $200 or $300 million a year to solve the energy needs for all of humankind.

So I am for the program, and I hope you will make the case over and over to both Houses of Congress that you intend to keep it as it is, because to risk losing science, technology, equipment, and facilities while we are doing a review of the program would be ludicrous. What if we got rid of the Princeton team, and they came up and said their approach is the right way to achieve fusion?

What if we got rid of magnetic fusion at Los Alamos, and they said their approach was promising. You do not pick that up after all of the great scientists have closed down one-half of the research facilities. Is that a fair statement?

Dr. DECKER. Yes, it is. I agree with what you said wholeheartedly.

HUMAN GENOME PROGRAM

Senator DOMENICI. All right. Now, let me move on to the genome program. Dr. Decker, you know that we have some exciting major science programs in our country. The Department of Energy and the National Institutes of Health ought to be excited because the scientists in the United States looked at all the major programs, including the superconducting super collider and all the rest, and their No. 1 choice by an overwhelming margin was genome research, the mapping of the human genome.

You're part of that effort. DOE is not the whole program. I would like to know—not now, but for the record—for what the money DOE asks for in the genome program will be used. DOE requests substantial money for this research initiative. For what do you intend to spend it? I have a parochial interest, of course, but I had a parochial interest that got the NIH interested, incidentally. They thought DOE was going to take the program over, and that is why they ended up hiring Dr. Watson. That is all right with me, but this subcommittee needs to know where the money is going to be spent.

[The information follows:]

HUMAN GENOME

We anticipate using the additional funds requested for the Human Genome Program in fiscal year 1991 to approximately double the support for development of innovative and cost-effective, new approaches to DNA sequencing and to double the support for the development and application of physical mapping strategies. In addition, the development of computerized data management, analysis and networking capabilities will be accelerated. Support for secondary activities will also be increased. These include: upgrading space and facilities at DOE laboratories, workshops, and meetings; communications of scientific and programmatic interest; and increased support for study of the ethical, legal, and societal issues associated with this research.

Senator DOMENICI. My other question has to do with the Los Alamos Meson Physics Facility, or LAMPF, and we will submit it to you for a response. You are aware of our great concern that a couple of these national user facilities have supplied America with many of its Ph.D. scientists, and yet they are only funded at one-half a year's operation.

SCIENCE EDUCATION INITIATIVES

My last question is along the lines of the distinguished chairman. I truly compliment the Secretary for the science education initiatives he is undertaking. We have a rare resource in DOE's national laboratories. We have to get them committed in an orderly way to helping the education system of this country.

The Secretary is interested enough that he believes the President should be involved in this kind of initiative.

In the meantime, let me suggest that all of us are anxiously waiting for major policy statements in that regard. Do you have any idea when they will be forthcoming?

Dr. DECKER. Major policy statement?

Senator DOMENICI. A major policy statement ensuring use of the national laboratories and their scientists, engineers, mathematicians, and facilities toward reaching the national goals for science and math education.

Dr. DECKER. We clearly are planning to do more of that in the 1991 budget. It is, as you said, a very major personal commitment on the part of the Secretary, one that I certainly share very deeply and, yes, the laboratories are our unique resource in helping the Nation in that area, and they will be used extensively.

SUPER CONDUCTOR SUPER COLLIDER

Senator DOMENICI. With reference to the superconducting super collider, I merely call your attention to an amendment that was passed by the Senate unanimously last year that required minority participation in that program. We have seen nothing indicating how you intend to achieve that directive. I would like very much for you to submit for the record how you intend to involve minorities in the superconducting super collider project.

[The information follows:]

MINORITY PARTICIPATION IN THE SUPERCONDUCTING SUPER COLLIDER

The DOE and the SSC Laboratory are seriously committed to ensuring that the goal of 10 percent of the SSC funding flows to minority businesses and institutions. Every direct procurement initiated by the Laboratory is first screened to determine if it can be fulfilled by a minority business. That this screening has been successful is apparent from the list of contract awards to date.

In addition, every large dollar-value solicitation issued by the SSC Laboratory states that the minority business plan will be a factor in the selection. For example, the team of Parsons Brinckerhoff/Morrison-Knudsen/CRSS was recently selected to provide architect-engineering/construction management services to the Laboratory in part because of their proposal to subcontract 10 percent of the award (estimated at $130M) to minority businesses.

In order to encourage minority contractors to participate in the SSC programs, the Laboratory staff have participated in 74 business-related outreach seminars in six states, reaching an audience of almost 10,000.

I am providing the listing of contracts made under the set-aside program to various minority businesses and colleges and universities.

Vendor	Amount
3D Technologies, Inc.	$ 286
A. J. Rod Company, Inc.	5,335
Ace Worldwide Moving	99,999
Airlogic	641
Allegro Systems, Inc.	2,370
Amer 1 Hour Photographics	204
Archive Supplies, Inc.	2,751
Aric's Lock and Key	192
Ashrae	53
Automation Image, Inc.	596
Aviles Engineering Corp	3,323
B&H Antenna Systems	768
Bill Green & Associates	6,694
Binding Systems of Dallas	15,636
Blind Spot	617
C. C. Scientific	428
Cable & Connector Whse.	5,800
Career Fair Coordinators	1,800
CBID	44,054
Chaparos Production LTD	1,500
Chiang Patel & Associates	2,000
Colorfast Photos	1,427
Commercial Interiors	60,450
Compu Supplies & Software	33,989
Compurite, Inc.	524,924
Computer Controls, Inc.	63,411
Country Valley Springwater	280

Cramar Ent/Design Group 1	15,323
Dal Mac Barnes Co.	3,615
Dallas Paper & Packaging	2,537
Dariana Technology Group	75
Data Com	809
Deneba Software	30
Diamond Office Supply	786
Diaz Garcia Enterprises	159
Duncanville Rental Center	11
Eiki International, Inc.	564
Empire Moving & Storage	99,999
Erica Atkin	3,200
F&R Construction Co.	450
Foreman Office Products	57,030
Frank Slesthenger	30,000
Genesis Imaging Tech, Inc.	20,669
Gilbert International	8,665
Ginger House	1,736
GTT Electronics	546
Horizon Office Products	20,874
Hudson Office Products	170,556
Index Computer, Inc.	2,708
Input Output Comp. Service	2,519
International Business	4,650
International Bus Consumables Co.	6,684
Jani King of Dallas	1,200
Jiasheng Zhou	9,200
Karleen Office Supply	1,802
Katherine Metropolis	6,400
Keran O'Brien	10,000
L.C. Jones Construction	17,294
Laser Tech, Inc.	170
Lecroy Corporation	8,284
Linda Franklin	3,000
Lowe Technologies	2,400
Luciana Lziaja	960
Mackie Printing & Office	76
Marguerite Kaminski	49,000
Martha Doty Freeman	1,500
Martin E. Thiele & Co.	94,388
McBride Micro Source, Inc.	33,406
Micro Way, Inc.	7
Microage	46,058
Microage Comp. Store	18,916
National Connect Tronix	15,994
National Society of Black	290
Office Interiors	12,782
Olde Tyme Frame Shoppe	277
Owens Fasteners & Supply	637
P&A Office Furn. Dist.	8,727
P&R Supply Co., Inc.	2,478
Pat Kreitz	507
People's Appliance Sales & SVC	1,322
Personal Training Systems	199
Personalized Business SVC	1,725

Phones Unlimited, Inc.	6,636
Pleasant Run Printing	2,487
Plenum Publishing Corporation	1,849
Polk Wisdom Printing Co.	5,046
Pronto	1,659
Provident Bank DeSoto	30
Quality Solutions Inc.	319
Reli Technical Services	4,427
Resource Electronics Dist.	786
Softsource	36,606
Software Associates	11,675
Software Spectrum	80,138
Software Systems, Inc.	10,269
Southwest Art Center, Inc.	30,893
Southwest Office Systems	1,860
Standard Industrial Supply	3,820
Tetra, Inc.	98,500
Threshold	2,189
Tjet Sun	3,600
Toshiki Tajima	14,381
TRB Company	3,390
Universal Technical System	1,130
Viking Acoustical Corporation	767
W.B. Contractors	1,650
Zip Printing	869

PREPARED STATEMENT OF SENATOR COCHRAN

Senator **Hatfield**. Thank you, Senator Domenici.

At this time, I would insert a statement in the record from Senator Cochran from Mississippi and submit to Dr. Decker some questions on behalf of Senator Cochran. This will be included along with the questions of Senator McClure and Senator Domenici.

[The statement follows:]

Statement of Senator Cochran

Dr. Decker, last year, in the fiscal year 1990 Energy and Water conference report, the conferees "urged the Department to explore the possibility of entering into a cooperative agreement with Mississippi State University to accelerate the transfer of [diagnostic] instrumentation technology to the private sector."

Before I ask you the status of the Department's response to that urging, I'd like to tell you a little bit about what is currently being done at Mississippi State.

The Diagnostic Instrumentation and Analysis Lab [DIAL] at Mississippi State has been operating for 13 years. They specialize in using optically-based instruments to analyze chemical flows. These instruments can not only measure the temperature, speed and size of particles in a chemical flow, but they also can tell you what those particles are made of. This enables a company or government agency which operates a plant to determine whether and where it has unintended leaks of certain substances. This helps plants to make their processes more efficient and reduce unwanted emissions. This could become especially important as new Clean Air Act requirements are implemented.

While these instruments were initially designed to work with the magnetohydrodynamics (MHD) program, DIAL has used them far beyond the needs of the MHD program. In addition to the industrial applications in which DIAL has already been involved, this equipment is used to train engineering students in the critical area of instrumentation technology. I am told that there is no program in the United States similar to the one at Mississippi State. Other instrumentation programs exist, but none like this optically-based program.

DIAL uses Department of Energy equipment in their work. They have taken instruments developed to a limited extent at DOE laboratories and have scaled them up to industrial use. In this sense, it is clearly a technology transfer program. Mississippi State has done this with a number of DOE instruments, and we would like to see a more formal agreement between the Department and Mississippi State for this type of technology transfer.

ADDITIONAL COMMITTEE QUESTIONS

We will submit the balance of the questions for response in the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTION SUBMITTED BY SENATOR COCHRAN

Diagnostic Instrumentation and Analysis Laboratory (DIAL)

Question: What has the Department done in response to the language in the conference report asking you to explore such a cooperative agreement?

Answer: Office of Energy Research staff have met twice with Dr. Steve Shepard, Mississippi State University, to review a preliminary proposal for a cooperative agreement between DIAL and the Department directed at transfer of the diagnostic instrumentation technology to additional industries.

Question: Is this something that will require new funding? If so, how much would be required?

Answer: No agreement or decision has been reached at the Department at this time regarding support of the proposal. When the Department determines if support of the proposal is merited, the issue of funding availability will be addressed at that time.

Question: The description in your statement of the Analytical Technology program seems to match DIAL's activities perfectly. Is that accurate?

Answer: No, the Analytical Technology program in the Biological and Environmental Research request is quite different. The instrumentation in that program is directed at biological systems. The DIAL proposal involves instrumentation to measure combustion parameters, principally in industrial processes.

Lawrence Berkeley Laboratory/Jackson State/Ana Mendez Program

Question: Each year for the past several years, the Congress has appropriated funds for the cooperative arrangement between Lawrence Berkeley Lab, Jackson State University in Mississippi, and the Ana Mendez Foundation in Puerto Rico. This has proven to be an excellent program to enable minority students to improve their education by participating with DOE scientists in research programs. Why is this program not included as part of the DOE budget?

Answer: We have been pleased with the progress and accomplishments in this collaborative research and education program. The purpose of this program has been both to strengthen the scientific research and education capabilities of the two participating minority universities and to encourage minority students to pursue careers in scientific or technical fields. We believe that these goals have been substantially achieved over the last several years and other sources of support should now be sought by the Jackson State group to continue or expand this collaborative program. Funds for the support of science education by the Department are limited and our priorities in the FY 1991 request are focused on precollege science education including the initiatives developed as a result of the Secretary's Math/Science Education Action Conference held last October.

QUESTIONS SUBMITTED BY SENATOR McCLURE

Liquid Contaminants in Soil

Question: Page 48 of Dr. Decker's March 21, 1990 statement before the Senate Energy and Water Appropriations Subcommittee credits development of an innovative sensor for detecting liquid contaminants such as fuel oil or solvents within soil to Pacific Northwest Laboratory. I have read recent press accounts, including a DOE news release (attached), which attributes this development to the Idaho National Engineering Laboratory. Can you reconcile this for the record?

Answer: The system for detecting petroleum or solvent contaminants in soils developed by INEL actually samples vapors derived from soil samples. It is used where extensive contamination is present such as in groundwater.

The system developed at PNL must be in contact with liquid in the soil. It can be placed around large storage tanks to detect leakage from such a point source. The components used in constructing the detector cost about $1.00. The detector is not yet in commercial use but it has been patented.

The two devices which use entirely different detecting systems have been developed independently, have been applied to detecting petroleum leaks, and are capable of other applications.

Boron Neutron Capture Therapy

Question: When does the Department of Energy expect the Health and Environmental Research Advisory Committee (HERAC) report on BNCT to be completed? If the report is not completed by April 15, 1990, I would like to be advised of the reasons for the delay?

Answer: The report of the subcommittee on boron neutron capture therapy (BNCT) is in the final draft stage, and is undergoing a final review by the parent committee. We do expect that the report will be available by April 23, and will advise you of the reasons for delay if this becomes necessary.

QUESTIONS SUBMITTED BY SENATOR DOMENICI

Magnetic Fusion

Question: To start with basics, has the Secretary appointed the members of the Fusion Policy Advisory Committee? Will you provide their names and biographies for the record?

Answer: Yes, the members of the Fusion Policy Advisory Committee (FPAC) have been appointed. H. Guyford Stever is the Chairman, and Dr. James Kane, Univ. of California at Berkeley, is the Executive Director. A list of the members and a brief biography of each follows:

FUSION POLICY ADVISORY COMMITTEE MARCH 1990

Dr. H. Guyford Stever, Chairman
Foreign Secretary (Retired)
National Academy of Engineering

Dr. Roger Batzel
Director (Retired)
Lawrence Livermore National Laboratory

Dr. Ira B. Bernstein
Professor of Applied Physics
Yale University

Dr. Robert W. Conn
Professor of Nuclear Engineering
Institute of Plasma and Fusion Research
University of California, Los Angeles

Dr. E. Linn Draper, Jr.
Chairman of the Board and President
Gulf States Utilities

Dr. Harold K. Forsen
Senior Vice President and Manager of R&D
Bechtel Group

Dr. John S. Foster, Jr.
Vice_President for Science and Technology (Retired)
TRW

Dr. T. Kenneth Fowler
Chairman, Dept. of Nuclear Engineering
University of California, Berkeley

Dr. Melvin B. Gottlieb
Director (Retired)
Princeton Plasma Physics Laboratory

Dr. William Herrmannsfeldt
Stanford Linear Accelerator Center

Dr. Charles F. Kennel
Professor of Physics
University of California, Los Angeles

Dr. Arthur K. Kerman
Director of Laboratory for Nuclear Science
Massachusetts Institute of Technology

Dr. Kenneth L. Kliewer
Dean, School of Sciences
Purdue University

Mr. John W. Landis
Senior Vice President and Director
Stone and Webster Engineering Corporation

Dr. R. Bruce Miller
TITAN Corporation

Dr. Barrett H. Ripin
Head, Space Plasma Branch
Naval Research Laboratory

Dr. Marshall N. Rosenbluth
Professor of Physics
University of California, San Diego

Dr. Robert Sproull
President Emeritus
University of Rochester

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Name	Present or Most Recent Position	C. V.
H. Guyford Stever	Foreign Secretary, National Academy of Engineering (Retired)	Aeronautical Engineering, Cal Tech, 1941, Ph.D: MIT, 1941-1965. Aeronautical, Mechanical, and Marine Engineering. Former Science Advisor to President Ford, Foreign Secretary, National Academy of Engineering; 1984-1989, ERAB Member.
Roger E. Batzel	Director, Lawrence Livermore National Laboratory (Retired)	Nuclear Chemistry, Ph.D., University of California, 1951; Senior Chemist, California Research & Development Co.

Name	Present or Most Recent Position	C. V.
Ira B. Bernstein	Professor of Applied Physics, Yale University	Theoretical Physics, New York University, 1950, Ph.D.; Westinghouse Research Laboratories, 1950-1954; Princeton, 1954-1964.
Robert W. Conn	Professor of Mechanical and Nuclear Engineering, University of California at Los Angeles	Fusion Engineering, Cal Tech, 1968, Ph.D.; Brookhaven National Laboratory, 1969-1970; University of Wisconsin, 1970-1980; former MFAC member; Member NAS Panel on Inertial Fusion; E.O. Lawrence Awardee, 1984.
E. Linn Draper, Jr.	Chairman of the Board and President, Gulf States Utilities	Nuclear Engineering, Cornell, 1970, Ph.D.; University of Texas, 1969-1979.
Harold K. Forsen	Vice President, Bechtel Corporation	Physics, Nuclear Engineering, UC, Berkeley, 1965, Ph.D.; General Atomics, 1959-1962; UC, Berkeley, 1962-1965; University of Wisconsin, 1965-1972; Exxon Nuclear, 1973-1980; Jersey Nuclear, 1973-1981; former member of Magnetic Fusion Advisory Committee (MFAC).
John S. Foster	Vice President for Science and Technology, TRW, Inc. (Retired)	Engineering Mechanics, Berkeley, 1952, Ph.D.; Director, Lawrence Livermore National Laboratory, 1961-1965; Director, Defense Research and Engineering, Department of Defense, 1965-1973; E.O. Lawrence Awardee, 1960.

Name	Present or Most Recent Position	C. V.
T. Kenneth Fowler	Professor of Nuclear Engineering, University of California at Berkeley	Theoretical Physics, University of Wisconsin, 1975, Ph.D.; Oak Ridge National Laboratory, 1957-1965; General Dynamics Corporation, 1965-1967; Lawrence Livermore Laboratory, 1967-1989. Former head of fusion program at Livermore. Former MFAC member.
Melvin B. Gottleib	Consultant, Grumman Corporation	Ion Exchange Surface Chemistry; Polytech Institute, Brooklyn, 1954, Ph.D.; Associate Director, Project Matterhorn, 1954-1961; Director, PPPL 1961-1989.
William B. Herrmannsfeldt	Senior Scientist, Stanford Linear Accelerator Center	Electronoptics, Ph.D. University of Illinois; Staff, Los Alamos National Laboratory; Advanced Research & Development Branch, Energy Research and Development Administration.
Charles F. Kennel	Professor of Physics, University of California at Los Angeles	Plasma and Space Physics, Princeton, 1964, Ph.D.; Avco Everett Labs, 1960-1961; Center for Theoretical Physics, Trieste, Italy, 1964-1966.
Arthur K. Kerman	Professor of Physics Massachusetts Institute of Technology	Theoretical Physics, MIT, 1953, Ph.D.; Cal Tech, 1953-1954; Institute for Theoretical Physics, Copenhagen, 1954-1955. Advisor to almost all DOE Labs, White House Science Council, 1982-1985.

Name	Present or Most Recent Position	C. V.
Kenneth L. Kliewer	Dean, School of Sciences, Purdue University	Solid State Physics, University of Illinois, 1964, Ph.D.; Iowa State University, 1963-1981; Argonne National Laboratory, 1981-1988.
John W. Landis	Senior Vice President & Director, Stone and Webster Engineering	Nuclear Power Safety, Lafayette College, 1939, B.S.; Eastman Kodak, 1939-1943; U.S. Navy, 1943-1946; U.S. Atomic Energy Commission, 1950-1953; Babcock and Wilcox, 1953-1968; Gulf General Atomic, 1968-1970; ERAB chairman and Member.
R. Bruce Miller	Manager, Electromagnetic Technology Development, TITAN Corporation, Spectron Development Laboratories	Nuclear Engineering, Ohio State U., 1973, Ph.D.; Manager, Directed Energy Research, Sandia National Laboratories, 1977-1987; U.S. Air Force, 1973-1977.
Barrett H. Ripin	Section Head, Naval Research Laboratory	Thermonuclear Research; U. Maryland, 1971, Ph.D.; Assistant Professor of Physics, UCLA, 1971-1973.
Marshall N. Rosenbluth	Professor of Physics, University California at San Diego	Theoretical Physics, University of Chicago, 1949, Ph.D.; Stanford University, 1949-1950; Los Alamos Scientific Laboratory, 1950-1956; General Dynamics Corporation, 1956-1960; UC, San Diego, 1960-1967; Princeton, 1967-1980; University of Texas, 1980-1988; Enrico Fermi Awardee, 1985; former MFAC member; member of NAS Panel on Inertial Fusion.

Name	Present or Most Recent Position	C. V.
Robert Sproull	President Emeritus and Professor of Physics, University of Rochester	Physics, Cornell, 1940, Ph.D.; RCA Labs, 1943-1946; Cornell, 1946-1968. Advisor to numerous National Laboratories, industry and universities.
Richard Wilson	Professor of Physics, Harvard	Physics, Oxford University, 1949; D. Phil., Christ Church College, 1948-1953; Claredon Lab., 1953-1961; Fulbright Fellow, Guggenheim Fellow.

Question: You indicate in your testimony that the "objective" of the Fusion Policy Advisory Committee will be to "review and update" DOE's fusion policy, including both magnetic fusion and inertial confinement fusion. The major focus will be on the "technical status" of these programs and how they should be structured. The temptation always exists for near-term results, and I fear that research into fusion concepts has fallen into that trap. Will you describe the issues you expect the Advisory Committee to address in this program review? Will the Advisory Committee be taking a long-term view of the potential of fusion as a practical, essentially unlimited energy source?

Answer: The Advisory Committee has been formed to take a broad look at what the Department's fusion policy should be. Specifically, it is to review the new draft fusion policy covering both magnetic and inertial confinement that was proposed last summer by the former Director of the Office of Energy Research, and to recommend a fusion policy for the Department of Energy. The final written report is to provide advice on how to structure the fusion programs -- either by the proposed policy, some specific modifications to it, or some totally different approach. The policy recommended by this Committee should include goals and objectives of the programs, a coherent strategy, an outline of the development path, identification of major decision points, determination of the role of international collaboration, and recommendations on funding levels.

I am certain that the Advisory Committee will take a long-term view of the fusion programs. In his charge letter to the Chairman of the Committee, the Secretary stated "I look to your Committee to help the Nation establish a wise, practical, and enduring policy for fusion, one that will enable fusion energy to be a valuable energy source in the next century."

Question: The original concept of this review argued that the magnetic and inertial confinement fusion programs essentially had equivalent near-term objectives, and DOE seemed to be setting up a situation where the nation might pursue only one program. I believe that is a false premise, and that DOE should not limit itself to a narrow focus of only burning fuel to the exclusion of other scientific and technological questions. Can you assure the Committee that the program review will take such issues into account?

Answer: Yes, I can assure you that the Committee is already looking at all the scientific and technical questions of fusion and is not looking only at burning fuel issues. In its first meeting on March 22 and 23, 1990 the Committee discussed their plans and heard initial presentations from the program offices and from principal scientists and engineers. Their discussions ranged across the whole range of scientific, technical, and policy issues, and the organization of the activities of the Committee is clearly geared to addressing all the issues.

Question: It is my understanding that the fusion community itself is proposing a fusion development plan to the Advisory Committee for consideration. Can you assure the Committee that the fusion community's proposal will be given serious consideration?

Answer: The Committee has already had a presentation at its first meeting on the fusion community's proposed plan for fusion development. This plan will be reviewed further by the Committee at its next meeting and will be seriously considered as the Committee begins to formulate its own suggested policy.

Question: Even though the FY 1991 budget request for magnetic fusion is somewhat above the 1990 level ($325.3 million compared to $320.3 million), it represents the lowest budget in over 10 years. Quite frankly, the program is barely hanging on, and with the results of the review not available until the end of this year's appropriations process, and that is very optimistic considering the Committee is not yet in place, it could be another year before the program is back on track. How can DOE hope to retain the talented scientists working in the fusion program at its national labs with a budget request that represents the lowest level of funding in over decade?

Answer: It is, of course, difficult to retain talented scientists and engineers when the program funding is decreasing and when major new facilities and new experiments are not forthcoming. Good scientific progress is being made with existing facilities in the United States and abroad, and some modest new experiments are worthwhile activities that provide interest in the short-term. The technical people that represent the Nation's knowledge and capability in magnetic fusion believe that the recent attainment of near-breakeven conditions in the Joint

European Tokamak and the Tokamak Fusion Test Reactor, and the good progress in attaining an international design for the ITER, will help establish confidence in the program. There is also hope that the new, high-level Advisory Committee will establish a new fusion policy that will favorably affect the program. It is clear, however, that a lack of opportunities to move the program forward will cause further loss of technical people and a further decrease in the programs technical capability.

Question: While I commend DOE's focus on promising alternate concepts for fusion, and restoration of construction funding for the Confinement Physics Research Facility at Los Alamos National Laboratory, what areas of the program will be reduced under this budget request?

Answer: In preparing the FY 1991 Congressional Budget Request, it was decided, that until the Fusion Policy Advisory Committee had completed its review of the fusion program, we should try to maintain the current program balance and options to the extent possible. Therefore, in order to accommodate this reduction in the level of effort on fusion research, across the board reductions were made resulting in an overall slowdown of program activities.

Question: Finally, the Department is engaged in the important task of developing a national energy strategy. Is the Department taking magnetic fusion into account as it drafts its national energy policy? How does the pending review relate to the development of a national energy policy?

Answer: The Interim Report on the National Energy Strategy that was released in early April, 1990 includes fusion energy as one of the energy supply technologies. The Interim Report describes a number of obstacles to progress and technical issues that must be resolved if the nation is to develop fusion energy. It is expected that specific strategies will be developed over the coming months leading to a National strategy by the end of 1990. The final report of the Fusion Policy Advisory Committee is expected in September, 1990 and will therefore be available to help determine the role of fusion in the National Energy Stategy.

Confinement Physics Research Facility

Question: Is there not a continuing need for a balanced fusion research program -- one in which all reasonable alternatives are sufficiently investigated to improve the prospects for the development of a potentially safe, reliable, and environmentally attractive energy source?

Answer: One of the four key technical issues that remains to be addressed in order for the program to reach its goal is to determine the best confinement configuration by studying potentially improved devices and fuels. The Magnetic Fusion Energy program supports work on this issue primarily through support of research on Reversed Field Pinch, Field Reversed

Configuration, Spheromaks, and Stellarator concepts. These all have magnetic configurations similar but different from those of tokamaks. Each offer potential technological advantages for a fusion reactor. The technical objective of this effort is to conduct experimental tests of critical physics issues on these concepts that are alternatives to tokamaks. Studies of these alternative configurations also provide unique insights to understanding the physics of all toroidally magnetically confined plasmas. Prior year budget decisions resulted in a narrowing of activities in this area by eliminating research on mirror devices and focusing on toroidal experiments.

Superconducting Super Collider

Question: It appears from your testimony that the plan to seek international contributions has been completed. Why is DOE delaying submission of the plan to Congress until completion of the review of the project design and modification of the cost estimates?

Answer: An international plan has undergone an interagency review process and its substance is being discussed with the Congress. The initial version of the International Plan sets out a framework in which DOE will conduct negotiations, and provides a strategy for approaching countries. Now that the Department has agreed to the need for a full 20 TeV machine with design changes to ensure rapid commissioning and reliable operation, and the footprint has been released to the State of Texas to begin land acquisition, the Department is ready to conduct visits and begin negotiations with other countries. The Deputy Secretary plans to lead a delegation overseas as early as June of this year.

Question: Does the Administration intend to revise the plan to find additional international contributions to help offset the increased costs of the project?

Answer: The International Plan will be revised in accordance with the progress in the negotiations, the status of the SSC program itself, revised or new legislation, and any changes in Administration policy or guidance.

Question: How much does DOE anticipate receiving under the proposed plan for international contributions?

Answer. The Administration's goal has been for one-third of the requested total project costs to come from non-Federal sources. This amount has been estimated in the past at about $2 billion. The State of Texas will contribute up to $1 billion for the construction of on-site facilities and other SSC systems. The Department is seeking the remainder from collaborative arrangements with other nations.

Question: Is there a specific dollar amount, or a specific proportion of the overall cost of the project?

Answer: Our goal is to secure one-third of the total project costs from nonfederal sources.

Question: What countries are the most interested in collaboration with the United States on the SSC?

Answer: We expect many countries to be interested in contributing to the large SSC detectors with which experiments will be conducted. We are also interested in soliciting contributions from abroad for the construction of the SSC; to date we have only made initial approaches to Economic Summit Countries. They, in general, are vigorous supporters of high energy physics research and are likely candidates to contribute to this part of the SSC program.

Question: What is the status of the preliminary negotiation with these countries?

Answer: In 1988, DOE officially announced to foreign governments our intention to go forward with the SSC, and we invited them to join in this scientific adventure. In 1989, international negotiations took a back seat to starting the SSC Laboratory in Texas, developing a site specific conceptual design, and completing an interagency International Plan which forms the basis for negotiations. Meanwhile, scientist-to-scientist discussions continued in those countries involved in high energy physics research.

Question: How soon could you reasonably expect to receive the first international contributions?

Answer: We will begin visits and government-to-government negotiations this summer. We are already experiencing some international participation through the time and effort spent by foreign researchers who are helping in the development of technologies for SSC detectors, and who participate in the SSC design and its reviews.

LAMPF and LANSCE

Question: I don't know about my colleagues, Dr. Decker, but I have sat through numerous budget hearings, and I have heard witness after witness bemoan the backlog of maintenance needs or constrained operational funding, while they have included expensive new projects in their budget requests. DOE is no exception to this situation. What is DOE's commitment to its national user facilities?

Answer: DOE is strongly committed to the support of its national user facilities. It should be recognized, however, that our budgets support operation of facilities and research. In the recent past research support in the laboratories has been sacrificed to meet the operational needs of the facilities. We have been reluctant to sacrifice university based research because of our strong commitment to education and to the individual investigator style research. Another factor that influences the support of user facilities is their passing into obsolescence - as the user field that it supports progresses with time. The DOE has terminated operation of a number of research reactor and accelerator facilities as a consequence.

Question: What good will our math and science and engineering educational initiatives do if we don't have, or adequately support, our national user facilities?

Answer: There is a large fraction of science and engineering research that does not depend upon our national user facilities. However, both research and facility operating funds compete for funds in the same budget. In recent years, user facility costs have exceeded price index increases. In addition, Congressional direction to support particular programs within the agency's budget request, without addition of funds, has exacerbated this situation. The result has been the compromise of available funds for both research and facility operations. In the main support for research at the laboratories has been sacrificed to meet the most important needs of the facilities but full support for them has not been possible.

The Basic Energy Sciences FY 1991 request provides near optimum support for the facilities while support for research in FY 1991 is below that in FY 1990.

Human Genome

Question: Where does DOE expect to put the $20 million in new funds it is requesting for genome research?

Answer: We anticipate that the bulk of these new funds will go to support multidisciplinary research at the three national laboratories with major human genome programs. These are the Los Alamos National Laboratory, the Lawrence Berkeley Laboratory, and the Lawrence Livermore National Laboratory. The genome program office intends to hold a series of reviews at these laboratories in order to ensure that the best scientific opportunities receive priority support. Other DOE laboratories are involved in more restricted areas of the program and many of these will receive increased support. In addition, we intend to again have a panel review of new proposals.

Question: I understand that two of the key areas DOE needs to focus on is our ability to manage new information, and expand "high-risk" technology developments that will lead to breakthroughs in mapping and sequencing technologies. I also understand that Los Alamos has been particularly productive in these areas, and has a tremendous expertise in "informatics." How much of the new funding will be put directly in the "Genome Centers" at labs like Los Alamos?

Answer: The Los Alamos National Laboratory indeed is one of the world's leaders in the development of computerized molecular biological databases and analytical tools. The Laboratory is developing some very promising new approaches to sequencing. The genome program office will this year hold a series of site reviews at the three major DOE laboratories (Los Alamos, Livermore, and Berkeley) to identify the most promising scientific opportunities to receive priority support. We anticipate that the bulk of the new funding will be allocated to these laboratories.

Question: I understand there may be some doubt still around about why the DOE is involved in genome research at all. Do you agree that the ongoing and dynamic involvement of the national labs -- with their unique, multidiscipline capabilities -- are critical to Federal genome research efforts?

Answer: I agree entirely. The multidisciplinary national laboratories provide locally managed capabilities that are being focused to achieve the objectives of this country's human genome project.

Question: Will you assure me that the tremendous resources at labs like Los Alamos will be used to their full potential?

Answer: We are well aware that the primary strengths of the DOE genome program reside in its multidisciplinary laboratories. It is our intent to continue to utilize those strengths to carry out the bulk of our genome program. The Los Alamos National Laboratory will play a major role in attaining the goals of the Department's human genome program.

Question: Of growing concern, as well, are the ethical/social concerns about the kind of capabilities improved genetic understanding will give us. Could you comment on what the Department is doing to assure we are fully considering the ethical side of this research?

Answer: The Department, in conjunction with the National Institutes of Health (NIH), has formed a joint working group to address ethical, legal, and social issues related to the human genome initiative. The working group contains members from the advisory committees of both agencies, as well as outside experts. It is now developing an agenda of activities and issues to be addressed. The working group met recently in Williamsburg, Virginia, for a combined workshop and working group meeting. Among the topics discussed by several invited speakers at the workshop were education, the media, confidentiality issues, and insurance. We expect the working group to be very active in stimulating discussion and studies of these issues. Both agencies provide funds to support these discussions and studies.

SSC Minority Participation

Question: I won't take the time of the Subcommittee to discuss this at length. I would just like to ask Dr. Decker if DOE has proceeded to implement this provision in its contracting activities for the SSC.

Answer: The DOE and the SSC Laboratory are seriously committed to ensuring that the goal of 10 percent of the SSC funding flows to minority businesses and institutions. Every direct procurement initiated by the Laboratory is first screened to determine if it can be fulfilled by a minority business. That this screening has been successful is apparent from the list of contract awards to date.

In addition, every large dollar-value solicitation issued by the SSC Laboratory states that the minority business plan will be a factor in the selection. For example, the team of Parsons Brinckerhoff/Morrison-Knudsen/CRSS was recently selected to provide architect-engineering/construction management services to the Laboratory in part because of their proposal to subcontract 10 percent of the award (estimated at $130M) to minority businesses.

In order to encourage minority contractors to participate in the SSC programs, the Laboratory staff have participated in 74 business-related outreach seminars in six states, reaching an audience of almost 10,000.

Question: Would you please provide for the record a listing of contracts made under the set-aside program to the various minority businesses and colleges and universities?

Answer: The SSC Laboratory has made contract awards to over 100 disadvantaged and women-owned firms. In addition to the firms provided in the insert, the Laboratory has set aside the management of its cafeteria to a disadvantaged business; the revenues of the cafeteria are estimated at $51,000. The security services will also be provided by a minority firm at a cost of $54,000. The Laboratory also issues blanket purchase orders for supplies to minority firms; these awards now total $227,000. Finally, on April 2, 1990, an award will be made to a minority travel agency which will be responsible for processing the travel of all Laboratory staff. The value of this contract is estimated at $8,000,000 over a multiple year period.

In response to your request, I am providing the listing of contracts made under the set-aside program as an insert for the record. (The information follows:)

Vendor	Amount
3D Technologies, Inc.	$ 286
A. J. Rod Company, Inc.	5,335
Ace Worldwide Moving	99,999
Airlogic	641
Allegro Systems, Inc.	2,370
Amer 1 Hour Photographics	204
Archive Supplies, Inc.	2,751
Aric's Lock and Key	192
Ashrae	53
Automation Image, Inc.	596
Aviles Engineering Corp	3,323
B&H Antenna Systems	768
Bill Green & Associates	6,694
Binding Systems of Dallas	15,636
Blind Spot	617
C. C. Scientific	428
Cable & Connector Whse.	5,800
Career Fair Coordinators	1,800
CBID	44,054
Chaparos Production LTD	1,500
Chiang Patel & Associates	2,000
Colorfast Photos	1,427
Commercial Interiors	60.450
Compu Supplies & Software	33,989
Compurite, Inc.	524,924
Computer Controls, Inc.	63,411
Country Valley Springwater	280
Cramar Ent/Design Group 1	15,323
Dal Mac Barnes Co.	3,615
Dallas Paper & Packaging	2,537
Dariana Technology Group	75
Data Com	809
Deneba Software	30
Diamond Office Supply	786
Diaz Garcia Enterprises	159
Duncanville Rental Center	11
Eiki International, Inc.	564
Empire Moving & Storage	99,999
Erica Atkin	3,200
F&R Construction Co.	450
Foreman Office Products	57,030
Frank Slesthenger	30,000
Genesis Imaging Tech, Inc.	20,669
Gilbert International	8,665
Ginger House	1,736
GTT Electronics	546
Horizon Office Products	20,874
Hudson Office Products	170,556
Index Computer, Inc.	2,708
Input Output Comp. Service	2,519
International Business	4,650
International Bus Consumables Co.	6,684
Jani King of Dallas	1,200

Jiasheng Zhou	9,200
Karleen Office Supply	1,802
Katherine Metropolis	6,400
Keran O'Brien	10,000
L.C. Jones Construction	17,294
Laser Tech, Inc.	170
Lecroy Corporation	8,284
Linda Franklin	3,000
Lowe Technologies	2,400
Luciana Lziaja	960
Mackie Printing & Office	76
Marguerite Kaminski	49,000
Martha Doty Freeman	1,500
Martin E. Thiele & Co.	94,388
McBride Micro Source, Inc.	33,406
Micro Way, Inc.	7
Microage	46,058
Microage Comp. Store	18,916
National Connect Tronix	15,994
National Society of Black	290
Office Interiors	12,782
Olde Tyme Frame Shoppe	277
Owens Fasteners & Supply	637
P&A Office Furn. Dist.	8,727
P&R Supply Co., Inc.	2,478
Pat Kreitz	507
People's Appliance Sales & SVC	1,322
Personal Training Systems	199
Personalized Business SVC	1,725
Phones Unlimited, Inc.	6,636
Pleasant Run Printing	2,487
Plenum Publishing Corporation	1,849
Polk Wisdom Printing Co.	5,046
Pronto	1,659
Provident Bank DeSoto	30
Quality Solutions Inc.	319
Reli Technical Services	4,427
Resource Electronics Dist.	786
Softsource	36,606
Software Associates	11,675
Software Spectrum	80,138
Software Systems, Inc.	10,269
Southwest Art Center, Inc.	30,893
Southwest Office Systems	1,860
Standard Industrial Supply	3,820
Tetra, Inc.	98,500
Threshold	2,189
Tjet Sun	3,600
Toshiki Tajima	14,381
TRB Company	3,390
Universal Technical System	1,130
Viking Acoustical Corporation	767
W.B. Contractors	1,650
Zip Printing	869

Science Education

Question: You mention in your testimony that three DOE national laboratories have, or are being, designated centers for math and science education initiatives. I am pleased to see that New Mexico is expected to become an additional partner in this initiative. What specific goals has DOE identified for its math and science education initiatives?

Answer: Seven DOE laboratories have been designated as Science Education Centers to date (Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Fermi National Accelerator Laboratory (Fermilab), Lawrence Berkeley Laboratory (LBL), Los Alamos National Laboratory (LANL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest Laboratory) (PNL). A wide range of science and mathematics education activities are supported at these (and other) laboratories for students and faculty/teachers encompassing all educational levels from precollege through graduate school. As a result of the Secretary's Math/Science Education Action Conference held in Berkeley, California, October 9-10, 1989, many new initiatives are being proposed by the laboratories to respond to the documented need to improve retention of students in the math/science educational pipeline. The specific goals identified for DOE math and science education initiatives include ensuring that students study math and science every year in grades K-12 as part of a core curriculum; that math and science teachers are full-share partners in the scientific community who are equipped to offer superior, hands-on instruction in math and science; that the participation of female, minority, disabled and disadvantaged students is increased; and that university research in both fundamental science and energy-related technology is encouraged so that there will be an adequate supply of well-trained people with the advanced skills needed to confront current and future energy challenges. We are working with a number of the laboratories who are developing collaborative regional programs including efforts by LANL in cooperation with the Sandia National Laboratory to work with the Native American and Hispanic school populations in rural and urban areas of New Mexico. DOE's major contributions to this nation's science/math education improvement will be through the utilization of its laboratory scientists and its facilities. DOE plans to broaden laboratory outreach activities to include partnerships with schools in the regions, to develop programs for teachers and students that will be models for the Federal government, and to encourage volunteerism and community service by DOE and contractor staff.

Question: How will DOE coordinate its math and science programs with those of other federal agencies, such as the National Science Foundation and the Department of Education?

Answer: Admiral Watkins has been appointed to chair a FCCSET committee on mathematics and science education. His vice chairs on this effort are from the National Science Foundation and the Department of Education. In addition, DOE staff meet regularly with staff from NSF and the Department of Education as well as other agencies including NASA. An ad hoc interagency working group has been established as a follow-up to the Secretary's Berkeley Math/Science Education Action Conference and DOE also participates on the NSF-led working group to follow-up on the Task Force on Women, Minorities and the Handicapped in Science and Technology report. Where common objectives are involved, staff works together to ensure that efforts are not duplicative. For example, Argonne National Laboratory staff is working closely with the project director of the NSF "Career Access Opportunities in Science and Technology" prototype award to Loyola University, Chicago, Illinois, to assure that all the collaborative efforts in Chicago are working toward the common goal of improving math/science education in the City and are not working at cross purposes. In a similar fashion, Lawrence Berkeley Laboratory staff is working closely with the project director of an NSF prototype award to the University of California at Berkeley as they develop a collaborative program in the Oakland area.

Question: Does DOE have plans to exchange information with other federal agencies as it identifies curricula or techniques that are successful in conveying basic mathematical and scientific concepts to students?

Answer: DOE is exploring possible mechanisms to ensure that instructional materials that are developed by teachers in the Teacher Research Associates (TRAC) Program are available to other interested teachers. Several discussions have been held with NASA and NSF on ways ~~to develo~~p a clearinghouse for instructional materials. DOE's Pacific Northwest Laboratory (PNL) has already worked closely with the Department of Education (ED) on a science course for secondary schools which was developed by their scientists in cooperation with the Richland, Washington, School District. The course is now being regionally disseminated, through a ED grant, to eight high schools and one community college in Washington and Oregon and has recently been endorsed by the U.S. Materials Education Council. PNL conducts a four-week summer institute and assists in curriculum enhancement.

SUBCOMMITTEE RECESS

Senator HATFIELD. Dr. Decker, thank you again for your presence here today. This subcommittee will stand in recess until 10 a.m. on March 27.

[Whereupon, at 3:05 p.m., Wednesday, March 21, the subcommittee was recessed, to reconvene at 10 a.m., Tuesday, March 27.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1991

THURSDAY, APRIL 19, 1990

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:20 p.m., in room SD–116, Dirksen Senate Office Building, Hon. J. Bennett Johnston (chairman) presiding.

Present: Senators Johnston, McClure, and Domenici.

DEPARTMENT OF ENERGY

ATOMIC ENERGY DEFENSE ACTIVITIES

STATEMENT OF DONALD KNUTH, ACTING DEPUTY ASSISTANT SECRETARY FOR OPERATIONS

OPENING REMARKS

Senator JOHNSTON. The subcommittee will come to order.

This afternoon we will receive testimony on the fiscal year 1991 budget request for the atomic energy defense activities of the Department of Energy.

We welcome each of you to the subcommittee and look forward to your presentation of activities for the upcoming fiscal year.

We will first hear from Dr. Knuth, followed by Dr. Barker, Assistant to the Secretary of Defense, Department of Defense.

Then, we will then hear from Admiral Barr, Deputy Assistant Secretary for Military Application at the Department of Energy; Dr. Richard Starostecki, Deputy Assistant Secretary for Nuclear Materials Production, Department of Energy; followed by Dr. Dominic J. Monetta, Director of the Office of New Production Reactors for the Department of Energy.

Dr. Knuth, would you please proceed.

Dr. KNUTH. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, I am Donald Knuth, the Acting Deputy Assistant Secretary for Operations, Office of the Assistant Secretary for Defense Programs.

I am here today representing Mr. John Tuck, the Acting Assistant Secretary for Defense Programs. Mr. Tuck is serving in this capacity at the request of Secretary Watkins, pending Senate confirmation of Victor Stello to the defense programs position.

PREPARED STATEMENT

Mr. Tuck has a detailed statement that I would like to submit for the record and summarize it for the committee today.

Senator JOHNSTON. Yes; without objection, Mr. Tuck's statement will be made part of the record.

[The statement follows:]

STATEMENT OF JOHN C. TUCK

INTRODUCTION

Mr. Chairman and Members of the Committee, I am John Tuck, Under Secretary of Energy and the Acting Assistant Secretary for Defense Programs. I am serving in this capacity at the request of Secretary Watkins pending Senate confirmation of Victor Stello to the Defense Programs' position. This post has been vacant for over 2 years. It needs to be filled.

I am pleased to present the Department of Energy's (DOE) FY 1991 Defense Programs appropriation request for $7.5 billion. The request excludes funding for New Production Reactors, Environmental Restoration and Waste Management, Waste Transportation and Site Management, and the Naval Reactor program which are part of the National Security budget function and will be addressed by separate organizations within the Department.

I would like to thank the Senate Appropriations Committee for your continued support. Your actions have helped us change the culture at DOE and set a course for the future. I will begin by offering some perspectives on the changing world scene, discuss the Defense Programs mission, address the challenges we are facing, and close with a discussion of Defense Programs budget needs.

THE CHANGING WORLD SCENE

Today, the world order is in a state of flux. Communism appears to be crumbling in Eastern Europe and democracy is on the rise. The Soviet Union, itself, is in the midst of significant political and economic change unthought of only one year ago. While it is premature to predict the outcome, we are hopeful these changes will be successful.

Recent trends in the Soviet Union have been dramatic in scope, and have permeated many facets of our relations with the Soviets. While all would agree that the threat from conventional forces is diminishing, the Soviet Union still has a formidable arsenal of strategic weapons. They continue, for example, to develop and deploy a growing number of new and improved missile delivery systems. Their production of nuclear materials continues unabated with no distinction between military and civilian production sources. To deal with this present imbalance will require that the U.S. maintain a credible nuclear deterrent for the foreseeable future. This lesson has been realized from 45 years of peace through strength, and we must not lose sight of it.

Credible nuclear deterrence, in today's environment, requires us to maintain the capability to respond to a variety of demands while negotiating with the Soviet Union for an orderly reduction in the numbers of strategic systems.

We have learned an important lesson in this country. Unfortunately, the lesson has been learned through years of neglect. For strategic defense to be successful, it must be achieved in a safe and environmentally acceptable manner. It makes little sense for this Nation to field a strong strategic deterrent if we spoil our environment, bring risk to our employees, and potential harm to our neighbors. This Nation cannot afford to meet production requirements at the expense of safety and the environment. There is no other choice; we must learn to achieve both.

While our nuclear weapons must be reliable, safety is absolutely essential. In this regard, DOE is actively pursuing the incorporation of state-of-the-art safety enhancements into new weapons systems. At the same time, we are continuing our nuclear weapons stockpile improvement program to enhance weapon safety for older weapons in the stockpile through retrofits and conversions.

MISSION

The Department of Energy's Defense Programs mission (Chart 1) contributes to national security by supporting the development, production, and maintenance of a credible, safe, and reliable nuclear deterrent. A variety of programs contribute to this mission beginning with the research, development, and testing capability. Defense Programs also oversees the manufacture, maintenance, and retirement of the weapons components and nuclear materials comprising our nuclear stockpile. Significant efforts are directed towards assuring that the Department's nuclear weapons, nuclear materials, facilities, and classified information are protected adequately. In addition, arms control efforts are being directed to assist other agencies in analyzing our adversaries' capabilities and their compliance with treaties.

CHALLENGES

Of late, this Nation's ability to produce nuclear materials in support of our defense responsibilities has been severely limited due almost entirely to environmental, safety and health concerns associated with operating old facilities. These concerns are the result of a long standing culture which placed the highest priority on production, with a lower priority being given to safe and environmentally sound operations. Management of the defense nuclear complex had not been brought into line with lessons learned in the civilian nuclear power industry subsequent to the Three Mile Island incident. The Department's defense production mission has been operating without a Senate confirmed Assistant Secretary for more than 2 years. Until recently, there were no long-range, comprehensive plans for cleanup of radioactive waste at DOE facilities. Facilities throughout the production complex had been allowed to deteriorate with no firm, integrated, and comprehensive plans for their modernization. Oversight of contractor activities had been inadequate, and in some cases conducted by personnel not possessing the requisite scientific, managerial, and technical skills to oversee these highly complex activities.

No one could review this list of challenges without concluding that there was an urgent need for change at the Department of Energy. On June 27, 1989, Secretary Watkins announced a Ten Point Plan to move the Department aggressively towards full accountability and compliance with environmental, safety, and health laws.

ACTIONS TAKEN TO DATE

We have initiated a major reorganization within Defense Programs to establish clear and direct lines of management responsibility. The Managers of the Savannah River Operations Office and the Rocky Flats Office now report to the Assistant Secretary for Defense Programs. Additionally, the Headquarters organizations have been realigned to provide added resources, clearer lines of authority, and enhanced capability to oversee field operations.

The recent increase in Federal pay , effective in January 1991, will provide some help in acquiring personnel with the technical skills required to manage the Department's national defense programs. Last year the Department supported Section 3142 of the Senate amendment to H.R. 2461, the FY 1990/1991 Defense Authorization Bill. The object of that provision was to enable scientists and other highly qualified individuals in the national laboratories to serve in critical positions in the Department of Energy without jeopardizing their return to the national laboratory system. While the full Congress did not support that provision, the Department continues to need such measures to recruit and retain appropriate personnel. Favorable action on these provisions likewise will provide the Department with the authorities it desperately needs in order to acquire the special skills and expertise necessary to enable it to resume safe and environmentally sound production activities in the Department's defense complex.

To put teeth into this new environmental, safety, and health emphasis, we restructured the existing system of award fee contracts for the defense production complex. Compliance with environmental, safety, and health laws and concerns now constitutes at least 51 percent of the contractors' semiannual award fee evaluation. This is a major departure from past practices where production took precedence over environmental concerns.

In addition, DOE: (1) established independent "tiger teams" to conduct environmental compliance assessments; (2) provided access to DOE nuclear facilities for State officials monitoring environmental, safety, and health compliance; (3) moved to strengthen technical capabilities of line-management and oversight personnel; (4) mandated compliance with OSHA standards in defense complex modernization plans; (5) improved DOE procedures for compliance with the National Environmental Policy Act; (6) established a new management team within the Department's office of Defense Programs to emphasize safety over production; (7) accelerated the cleanup of DOE facilities; (8) began development of a comprehensive epidemiological data repository containing information on past and present DOE workers that may be used by any qualified researchers; and (9) appointed an independent advisory panel to evaluate changes needed in the Department's epidemiological program.

DEFENSE ACTIVITIES

Effective and responsible management of the Department of Energy's Defense Programs demands that production requirements be placed into proper perspective. We must move aggressively towards full accountability and operating our facilities in compliance with environmental, safety, and health laws. The budget we have proposed reflects these changing priorities.

The Department's FY 1991 Defense Programs $7.5 billion budget request has been structured to: (Chart 2)

- Emphasize bringing our facilities into compliance with all Federal and State agreements and regulatory requirements.
- Continue operational improvements at Savannah River and Rocky Flats.
- Meet weapons production and nuclear material requirements as agreed to with the Department of Defense.
- Maintain an adequate weapons research, development, and testing capability.
- Support the transfer of technology to the private sector where appropriate.
- Improve management of Defense Programs operations through increased Federal staffing.
- Continue efforts to reduce the backlog of security reinvestigations.
- Close out the Special Isotope Separation program.

The $7.5 billion budget request (Chart 3) for the Department's Defense Programs in FY 1991 represents an 11 percent increase over the FY 1990 appropriation of $6.7 billion. Chart 3 compares the FY 1991 funding request to the FY 1990 appropriation for each program.

Consistent with the Department's changing priorities, Chart 4 presents the areas of major funding changes from FY 1990 to FY 1991. The area of largest increase, where a real growth of $338 million is being provided, is the continuation of reactor safety and support facility improvements at the Savannah River Site. The FY 1991 budget request also provides an additional $155 million for operational improvements at Rocky Flats. Of significant concern is the fact that in order to meet the high priorities of Savannah River and Rocky Flats, the Weapons Research, Development and Testing Program could not be supported at the desired level. This program element, which represents the base upon which our nuclear deterrent is founded, as well as much of our investment in the future, must be supported.

Weapons Activities

The Weapons Activities portion of Defense Programs is comprised of the Weapons Research, Development and Testing program, and the Weapons Production and Surveillance program. These programs are responsible for providing and maintaining this Nation with a modern, safe, and credible nuclear deterrent capability. The FY 1991 funding request for the Weapons Activities (Chart 5) totals $4.7 billion, a 9 percent increase over FY 1990.

Weapons Research, Development and Testing

For FY 1991, the overall Weapons Research, Development and Testing (RD&T) budget of $1.9 billion will remain at basically the FY 1990 funding level with no adjustment for inflation. The FY 1991 budget supports a technology transfer initiative ($10 million) to develop cooperative agreements between DOE's laboratories and U.S. industry. In this regard, we have already received over 40 high-quality proposals to carry out these types of arrangements. The FY 1991 budget also provides for a modest nuclear weapons test schedule. Let me emphasize that nuclear testing, within the core program, is necessary to support research to avoid technological surprise, conduct development programs for new weapons in response to changing threats, and to maintain the safety and reliability of our nuclear weapons stockpile. There continues to be a small reduction in our laboratory RD&T employment from 9,422 in FY 1990 down to 9,175

FTE's in FY 1991. These reductions will occur largely through attrition and transfer of staff to other laboratory programs.

The Nuclear Directed Energy Weapons (NDEW) program supports DOE's threat assessment mission and is necessary to avoid technological surprise. The NDEW budget has been scaled back from $214.4 million in FY 1990 to $191.9 million in FY 1991, and will focus on assessing three major concepts: x-ray laser, hypervelocity projectiles, and optical frequency laser concepts. This reduction is necessary in order to support other high-priority activities.

The budget request for the Inertial Fusion (IF) program is below the FY 1990 level of effort. However, the IF program is important and remains an integral part of the Weapons Research, Development and Testing technology base and helps our scientists understand the many phenomena that occur during a thermonuclear explosion. A near-term objective of the program is to explore the feasibility and affordability of a laboratory microfusion facility. This new experimental facility would advance weapons physics simulation and effects capabilities but cannot substitute for underground tests of nuclear weapons.

Weapons Production and Surveillance

The Weapons Production and Surveillance (WP&S) program supports the manufacture, monitoring, maintenance and retirement of all weapons comprising the Nation's nuclear weapons stockpile. This program funds the procurement of non-nuclear materials, the fabrication and assembly of new nuclear weapons and weapons components, and the life-time maintenance and reliability assessment of the existing nuclear weapons stockpile. Other activities include the development and operation of safe-secure systems for transporting nuclear weapons and weapons components; the construction of weapons system production and production support facilities; and environmental, safety, and health, and safeguards and security upgrades. This program is also responsible for plant operations at the seven weapons production plants. These requirements are developed jointly by the Departments of Defense and Energy and are approved by the President in the annual Nuclear Weapons Stockpile Memorandum.

The FY 1991 Weapons Production and Surveillance budget request is $2.8 billion--an increase of $382 million over FY 1990. After taking inflation into account, the budget request reflects increases of $155 million to pay for operational improvements at Rocky Flats, $19.7 million to enhance our transportation safeguards capability, $23 million to implement new training regimes--principally at Rocky Flats, and $23 million to partially fund the contract closeout with the Monsanto Corporation. The latter was part of the contractor changeover at the Mound Plant that occurred in 1988. Weapons production includes deliveries of the B61 Tactical Bomb, the W80-0 Sea Launched Cruise Missile Warhead, the W80-1 Air Launched Cruise Missile Warhead, the B83 Strategic Bomb and the W88 Trident II Warhead. Funding is also included to continue the Facilities Capability Assurance Program, an ongoing effort to upgrade aging weapons production facilities.

ROCKY FLATS RESUMPTION & BUILDING 371

I want to take a moment and address the situation at Rocky Flats. Plutonium operations were suspended in early December during the semi-annual nuclear materials inventory. we have extended the suspension of operations to permit EG&G, the new contractor, to install their own management team, gain a comprehensive understanding of plant operations, implement several changes in terms of formality and discipline of operations, and to increase the margin of safety in plutonium operations. The current schedule calls for the resumption of plutonium operations in the second quarter of calendar year 1990 beginning with aqueous plutonium recycle processes in Building 771. Thereafter, operations are planned to resume sequentially until full plutonium operations are restored during the third quarter of calendar year 1990.

An environmental impact statement will be prepared for the proposed plutonium recovery modification project at Rocky Flats, Building 371. This project is intended to replace outdated and unreliable facilities which cannot be upgraded to meet today's environmental and safety standards. The project is being proposed to provide reliable processing capability, using a more environmentally benign chemical process, to reduce waste generation and to help eliminate backlogged residues now stored in drums. Before this facility is allowed to operate, an environmental impact statement and safety analysis report will be completed and reviewed by Admiral Watkins. Regardless of whether DOE ultimately relocates plutonium processing to another site, this project will be needed to process residues that cannot be processed in existing facilities.

Nuclear Materials Production

The FY 1991 budget request for Nuclear Materials Production (NMP) (Chart 6) is $2.4 billion, a 15 percent increase over the FY 1990 appropriation of $2.1 billion. The major element driving the funding increase is the ongoing effort to improve our operations at the Savannah River Site, which I previously mentioned.

The NMP reactors are the Nation's only means of producing most nuclear materials to meet defense requirements. The principal materials produced are tritium and plutonium. Enriched uranium is obtained from gaseous diffusion. This program also produces nuclear materials for use in government research and development activities and in civilian research, commercial and medical applications. I cannot overemphasize that the facilities comprising this Nation's ability to produce nuclear materials are very old, fragile, and extremely vulnerable to disruptions.

Most of the facilities in the Defense Programs' complex were built during the 1950's and early 1960's largely as a reaction to World War II and the following Cold War. As a result, the facilities were built to much less stringent environmental and safety regulations. During the 1970's and 1980's, a number of these facilities were permanently shut down after years of neglect. Meanwhile, the commercial nuclear industry was learning much about the potential effects of its operations on workers and the public. They responded by making physical and procedural changes in the way they operated their facilities. DOE now faces similar challenges but, at the same time, must plan and implement the modernization of the complex for the future.

Facilities and Operational Improvements

Currently, the Nuclear Materials Production program is not producing any tritium or plutonium. All reactors are shut down so that improvements can be made to reactor hardware, procedures, training, management systems and practices, and maintenance to assure future safe operation. Many of these improvements are not one-time activities, but rather will require a sustained level of funding for as long as the reactors operate. The need to continue to operate facilities that were designed and built over 35 years ago has led to a backlog of maintenance upgrades and operational improvements that need to be addressed.

The program's first priority is to resume production of tritium as soon as improvements can be made to ensure the continued safe and reliable operation of the reactors at Savannah River. Corrective actions are now being taken to ensure the continued safe and reliable operation of the reactors at Savannah River to produce tritium. To allow for public participation in the restart process and to further the purposes of the National Environmental Policy Act (NEPA), DOE is preparing an Environmental Impact Statement (EIS) concerning reactor operations. In addition, the Department is conducting a safety evaluation, and we will issue a Safety Evaluation Report (SER) that documents the technical basis for our decisions. A final decision to restart one or more reactors will only be made after the Secretary has reviewed and approved these documents. Secretary Watkins expects to finalize these dates this month, but no final decision will be made until after the environmental impact statement is completed.

The current status of many of the nuclear material processing operations at Savannah River is similar to that of the reactors, before intensive safety enhancement efforts began. Funding priorities in prior years forced the deferral of preventive maintenance, operational improvements, operator training, enhanced technical support, and improved incident analysis systems. DOE cannot, and will not, operate these facilities without the assurance that they can be operated safely and reliably. The Department must begin to correct these deficiencies or face eventual facility shutdown.

On December 21, 1989, the National Research Council of the National Academy of Sciences issued a report entitled, "The Nuclear Weapons Complex, Management for Health, Safety and Environment." The Council's study focused on the 17 major non-reactor installations in the nuclear weapons complex. Their report provided recommendations for many improvements in the areas of management, industrial safety, fire safety, criticality safety, seismic safety, and occupational health. Many of their findings echo the type of improvements currently included in our reactor restart program. The Department is preparing a response to the report and will develop an implementation plan to address these issues. However, the results of the Council's study were not unexpected. In fact, based on experience gained at our reactor facilities, DOE had already taken steps to identify problems at non-reactor facilities. At the Savannah River Site, this resulted in the development of a Non-Reactor Improvements Plan. Although funded at a slower pace than the Reactor Operations Management Plan, the Non-Reactor Improvements Plan and similar efforts at other sites have been incorporated into our FY 1991 budget request.

NMP Initiatives

These initiatives include improvements in procedures and training at the Savannah River Site, with emphasis on the reactor operations area and reactor safety construction activities. Efforts will continue on the complex-wide productivity retention facility enhancements, restoration of the Idaho Fuels Processing Facility to provide increased capacity for the increased recovery of Naval spent fuels, and ongoing capital equipment expenditures for facility and infrastructure improvements.

This budget implements an orderly closeout of the Special Isotope Separation (SIS) program. Based on a careful review of weapons-grade plutonium requirements, we have determined that the production capability that would have been provided by the SIS facility cannot be justified in relation to higher funding priorities. We will, however, complete development activities during FY 1991 in order to preserve a viable option to deploy this technology, should future national security demands dictate.

Security Affairs

The Security Affairs portion of Defense Programs is comprised (Chart 7) of the Verification and Control Technology program, the Nuclear Safeguards and Security program, and the Security Investigations program. The FY 1991 budget request for these programs totals $330 million; a 13 percent increase over the FY 1990 appropriation of $292 million.

Verification and Control Technology

The Verification and Control Technology program supports the development and execution of U.S. national security and foreign policy interests in the areas of treaty verification, intelligence, and arms control. The $174 million request provides an increase of $8.2 million for the FY 1991 effort. We have developed, or are developing, systems to verify compliance with the Limited Test Ban Treaty, Threshold Test Ban Treaty, Peaceful Nuclear Explosions Treaty, and Intermediate Range Nuclear Forces Treaty, as well as a future Strategic Arms Reduction Treaty, Chemical Warfare Treaty, Conventional Forces in Europe Treaty, and the Open Skies initiative.

In addition to longstanding intelligence interests and activities, Secretary Watkins has expanded the role of intelligence to provide foreign intelligence in support of such Departmental and national policies as the development of a comprehensive National Energy Strategy, safe and environmentally sound disposal of radioactive waste, strengthening the domestic energy industry's ability to compete in the international marketplace, and responding to the challenge of potential global climate change.

Nuclear Safeguards and Security

The Nuclear Safeguards and Security program is responsible for developing policy and research and development into measures to assure adequate protection of the Department's nuclear weapons, nuclear materials, facilities and classified information against theft and sabotage, espionage and terrorist activity. Technical support is also provided to international activities designed to minimize the proliferation of nuclear weapons. The FY 1991 request of

$91 million will provide a balanced program, with emphasis on strengthening protection against the potential insider threat. This is in keeping with recommendations contained in an interim report prepared by the Secretary's Safeguards and Security Task Force which is reviewing the status of safeguards and security throughout the DOE complex.

Security Investigations

The Security Investigations program funds background investigations for DOE and contractor personnel who require security clearances. Such clearances are required for those individuals requiring access to restricted data, national security information or special nuclear material. Actual investigations are conducted by the Federal Bureau of Investigation and the Office of Personnel Management.

The FY 1991 budget request of $65 million will enable the Department to continue to conduct initial investigations for new employees while reducing significantly the backlog of overdue reinvestigations. Additional security investigation requirements result from increased remedial efforts underway currently at the Savannah River Site and Rocky Flats Plant, as well as implementation of the Personnel Security Assurance Program for those personnel involved with nuclear explosives, components and special weapons assemblies.

FY 1990 Reprogramming Request

A related funding matter I wish to discuss briefly with you today is the need for urgent support of the FY 1990 Defense Programs request forwarded to you in February to reprogram $291 million from within the Atomic Energy Defense Activities appropriation and to transfer $135 million from the Department of Defense to the Department of Energy. Your cooperation is urgently needed to enable the Department to continue efforts to upgrade the Savannah River reactors for restart; and continue the defense production complex on an approach towards achieving compliance with applicable regulations; strengthen security protection; improve and broaden Federal management oversight; and place the N Reactor at Richland, Washington, in a dry standby status.

These actions are essential to our efforts to continue with several of the initiatives underway in the Department. The production of tritium can resume only after the safe restart of the Savannah River reactors. Problems within the production complex must be addressed to improve the quality and safety of operations. Environmental and safety concerns must be resolved to assure the next generation that the Department's facilities are environmentally sound. Your favorable action on this request will allow us to move expeditiously on these important actions.

CLOSING REMARKS

We have worked extremely hard this year to obtain a firm understanding of the magnitude of the problems facing DOE. During this period we have established new goals, initiated a major change in the DOE culture, and developed new budget plans to achieve our objectives. Along the way, I believe we have set in motion those processes necessary to carry the Department to a new, higher level of efficiency and effectiveness. At present, we are by no means out of the tunnel but at least we are beginning to see a distant glimmer of light. I expect the Department's condition to be good by the end of this year, and excellent by the end of 1991.

While we are making progress, we have concerns (Chart 8) and there are risks associated with accomplishing our objectives on schedule. While we believe the Savannah River reactor restart schedule will be achieved, there are concerns associated with the timely resumption of operations at Rocky Flats, and our ability to meet future DOD weapon delivery requirements. Other uncertainties, for which funding has not been included in our FY 1991 budget request, are the unknown requirements which may be identified by our Tiger Team investigations, and verification requirements which are not in place today. We are also concerned about the downward trend we are experiencing in our national laboratories. In the present time of major change, the Weapons Research, Development and Testing Program represents our ability to respond and the fundamental capabilities which must be supported.

I personally want to thank you for your support. It has been a significant factor in helping us change the course at the Department of Energy. As new dimensions take shape--sounder environmental stewardship, safer facility operations, and changing defense requirements--I look forward to working with the Congress to secure the necessary resources and support to carry out effectively and completely the Department's important mission.

ADDITIONAL PREPARED STATEMENTS

Dr. KNUTH. I am pleased to appear before you today in support of the Department of Energy's fiscal year 1991 defense programs appropriations request for $7.5 billion. The request excludes funding for the new production reactors, environmental restoration and waste management, waste transportation and site management, and the Naval reactors program. These programs are administratively separate from defense programs, but are part of the national security budget function.

Since you have introduced the other participants in this hearing, I would also like to add that in attendance today are the Acting Deputy Assistant Secretary for Security Affairs, William Barker; representing the newly formed Office of Intelligence, reporting to the Secretary, Eugene Bacher; the Director of the Office of Arms Control, Dr. Victor Alessi; and the Director of the Savannah River Restart Office, Steve Richardson.

Mr. Barker, Dr. Alessi, and Mr. Bacher's office all have detailed, prepared statements, which we would like to submit for the record.

Senator JOHNSTON. Without objection, they will be included as well.

[The statements follow:]

STATEMENT OF WILLIAM BARKER

INTRODUCTION

Mr. Chairman and members of the Committee, I am William Barker, Acting Deputy Assistant Secretary for Security Affairs (DASSA). I am pleased to address the Department of Energy's Security Affairs programs of Nuclear Safeguards and Security (including Classification and Technology Policy), and Security Investigations, and the FY 1991 budget request required to carry out these programs.

Mr. Chairman, this is my first opportunity to appear before this Committee, and I want you to know that I intend to keep you fully and currently informed on Security Affairs activities of interest to your Committee. I will routinely communicate program initiatives and areas of concern to you and the Committee. I will be pleased to meet with you, Committee members, or the Committee staff at any time to discuss matters of interest.

SAFEGUARDS AND SECURITY TASK FORCE

Before I discuss the details of the critical role Security Affairs fulfills in the Department's national security mission, I would like to provide you with the status on Secretary Watkins' review of safeguards and security at DOE facilities. As part of the Secretary's overall review of DOE operations, he asked Under Secretary John Tuck in April 1989 to conduct a comprehensive assessment of the status of security at DOE facilities. The Under Secretary outlined a four-step plan and formed a task force of uniquely qualified individuals to accomplish the review. The plan includes an examination of missions, responsibilities, and objectives of Departmental elements in support of security; evaluation of previous studies, reviews, and inspections; an intensive analysis of selected facilities and functions; and preparation of a comprehensive report.

The task force has provided the Secretary an interim status report which highlights several items requiring attention by all Departmental elements, as well as several safeguards and security activities that deserve special recognition for a job well done. Areas of concern included classified document control, nuclear material control and accountability (MC&A), the clearance process, control of foreign visits, and protective force qualifications and training. The task force is continuing its review and plans to present a final report in the near future. Please be assured, Mr. Chairman, that we are already addressing many of these concerns.

SECRETARY'S ANNUAL REPORT

The Secretary's Annual Report to the President on Domestic Safeguards and Security, completed in November 1989, included information from the Secretary's task force review. A new concept was utilized for the preparation of the Annual Report. The Department established a profile system for evaluating safeguards and security at Departmental installations. The system is based on the results of inspection and oversight activities and requires rating various aspects of protection at each site by those responsible for facility operations. The ratings ("satisfactory," "marginal," or "unsatisfactory") are further reviewed and evaluated by DOE Headquarters.

This evaluation confirmed that our ability to mitigate the potential outsider threat is at an acceptable level at our nuclear weapons facilities. Sustained management attention to physical security upgrades and the strengthening of DOE's protective forces contributed to this accomplishment. Over the last several years, the Department has substantially increased protective forces which are better trained and better equipped and are now a proactive force capable of protecting our national security assets. In addition, the use of helicopters at four of our larger DOE sites provides enhanced surveillance and response for security emergencies. Facility protection at our critical sites has been improved with the completion of major construction projects. High-tech perimeter detection systems have been installed at almost all our facilities. Lastly, our fabric for deterrence --access controls, barriers, hardened sites, and security response team capabilities -- is as good as any security system in the United States.

This evaluation also confirmed the need for the Department to shift the emphasis of our safeguards and security program to development of systems and strategies to mitigate the potential insider threat. Progress has been made to address the insider but at a much slower pace than we would like.

Seven of 20 nuclear weapons facilities were rated "marginal," in the November 1989 Report to the President, due to deficiencies in programs and systems critical to protection against the potential insider threat. Some improvement, however, has been made in addressing this potential threat by stressing fundamental programs to deter and reduce the likelihood of hostile acts by an insider, and to detect and mitigate the consequences of such acts.

A number of actions have been initiated to also address potential acts of theft of special nuclear material (SNM) by insiders. The Department is implementing performance-oriented requirements to allow more cost-effective expenditures of resources for MC&A systems. Improvements in MC&A practices are being emphasized at key sites. The safeguards and security technology development program has produced advances such as better site portal monitors for detecting removal of SNM, and better measurement equipment and data systems designed to increase the assurance that nuclear material accounting records are not falsified by exploiting measurement uncertainties or accounting records. Measurement systems installed in-line at many facilities permit more timely and accurate determination of material in process. The above are designed to provide a defense-in-depth approach. We have also organized teams of experts to investigate and determine causes of incidents involving the MC&A of special nuclear material.

We have made considerable progress, but much work remains to be done and future emphasis will continue in assuring adequate protection against the potential insider threat.

MISSION

The Security Affairs programs are the Department's cornerstone in: developing and implementing policy, guidelines and procedures to prevent the theft of nuclear weapons or materials, the sabotage of facilities, and the compromise of classified information; providing an effective technology base for application to Departmental safeguards and security programs; supporting international safeguards and physical protection to deter the diversion of nuclear materials and to promote nonproliferation and national security objectives; developing and implementing policy for managing the classification and declassification of information; controlling proposed exports of nuclear materials technology and equipment; and implementing a program to transfer unclassified technology from our defense complex to U.S. industry.

BUDGET

Security Affairs requests $156 million for FY 1991. This consists of $91.0 million for Nuclear Safeguards and Security (including $8.1 million for Classification and Technology Policy) and $65.0 million for Security Investigations.

NUCLEAR SAFEGUARDS AND SECURITY PROGRAM ACTIVITIES

Mr. Chairman, the Nuclear Safeguards and Security Program budget request for FY 1991 is $91.0 million. Operating expenses require $83.9 million (includes $8.1 million for Classification and Technology Policy), capital equipment $5.1 million, and general plant project construction of $2 million. I will address the following basic elements: safeguards and security operations, technology development, international safeguards, and classification and technology policy.

SAFEGUARDS AND SECURITY OPERATIONS

Elements in this budget category include such activities as the New Brunswick Laboratory (NBL); the Nuclear Materials Management and Safeguards System (NMMSS); the Central Training Academy (CTA); Technical Security Countermeasures (TSCM) program; and guidance and assistance to DOE field operations for safeguards and security program improvements.

The New Brunswick Laboratory, Argonne, Illinois, is the national standards laboratory for nuclear materials measurements and serves as the technical extension of the Office of Safeguards and Security in the areas of measurement science, calibration, and evaluation of material accountability. NBL's functions include: maintaining and improving an internationally-compatible reference base for nuclear material measurements; assessing measurement technology in support of the DOE nuclear fuel cycle and weapons production activities; developing, certifying, and distributing reference materials for calibration and standardization of nuclear material measurements; and assisting in technology exchange and training in safeguards measurement technology.

In cooperation with the Nuclear Regulatory Commission (NRC), we will continue to operate the Nuclear Materials Management and Safeguards System (NMMSS), the nation's single nuclear material database, conducted at Oak Ridge, Tennessee. The tracking of US-origin nuclear material involving DOE contractors, NRC licensees, and foreign trading partners is integral to the mission for control of nuclear material. NMMSS maintains information needed by facilities to verify the shipment and receipt of nuclear materials to reconcile nuclear material inventories at DOE facilities.

The Central Training Academy (CTA) is the focal point for all Office of Safeguards and Security (OSS) training and dissemination of training doctrine. Training at the CTA covers the areas of physical security, protective force operations, security education, computer security, and material control and accountability. Standardization of training has assisted DOE in developing a protective force able to counter threats against the Department's nuclear materials and facilities. The CTA has seen a dramatic increase in classes offered from three courses in 1984 to over forty projected for FY 1991 and is recognized as a national training asset. We are proud of the advances made at CTA and will continue these improvements in FY 1991. The major portion of the funding increase will maintain existing facilities which in some cases are substandard. In addition, the Department is requesting General Plant Project funds of $2 million in FY 1991 for needed facility upgrades.

The DOE Technical Surveillance Countermeasures (TSCM) program protects against the theft of classified information by technical means. Modern intelligence collection utilizes equipment and devices incorporating state-of-the-art technology to accomplish technical penetrations of targeted areas. The detection of clandestinely installed devices is extremely difficult, and countermeasures are achieved only with highly trained personnel using specialized techniques and equipment. A program to certify the competency of DOE TSCM investigators is underway. These efforts in training and certification will significantly improve the overall technical security posture of the Department.

We have come to realize a more effective safeguards and security planning process was needed to consider long-term programmatic requirements and trends, identify strategic policy issues affecting the outyears, and identify actions which address concerns and vulnerabilities of the Department's critical facilities and assets. To answer the question "How much is enough," a corporate planning approach has been developed with Master Safeguards and Security Agreements (MSSAs) as the base planning documents. The program employs agreements between DOE Headquarters and field office management setting the site-specific protection levels at critical DOE nuclear sites and facilities. These agreements are, in effect, "living documents" that commit the parties to support graded safeguards and security systems. At present, MSSAs are planned for 47 DOE facilities and 18 have been approved. In support of the MSSA process, the standardization of vulnerability assessments within the Department has led to the development and use of sophisticated, user-oriented computer models. These models are critical for assessing the effectiveness of our facility protection programs and completing facility MSSAs. We will continue to emphasize the completion of the remaining agreements.

The Department recently provided the Congress with a report on the DOE's airspace initiative. The Federal Aviation Administration (FAA) and DOE are working together toward a goal of establishing new or expanded Prohibited Airspace over nine additional facilities. FAA and DOE have agreed to proceed with rulemaking to accomplish this goal. As an integral part of the process, we will hold informal public meetings at the nine locations this spring. The

Department will make every effort to be responsive to all public concerns. We have based our altitude and boundary proposals on extensive discussions with our field security staffs and have requested minimum altitudes consistent with our security and safety needs. Based on our discussions with the FAA we hope to have these restrictions in place by the Spring, 1991.

We are continuing efforts to improve security policies, practices and procedures for classified document control. We have begun the revision of DOE Orders which govern classified document control and are conducting a comprehensive secret document inventory. The most aggressive and visible areas of improvement have been in the education and training aspects of document control. Several courses of instruction have been proposed to ensure consistent and standardized classified information control throughout the DOE complex.

Another major safeguards and security initiative is the design of a standardized enhanced access control system to address the potential insider threat. Known as the Personnel Access Control and Security Enhancement System (PASS), it will feature a new, completely compatible photo credential that can be "programmed" to identify the individual badge holder and selected pertinent information. Additional development and enhancements will enable facilities to automatically restrict, localize, and record access, enforce the two-person rule, and expedite access authorization information among facilities. The Department plans to install a pilot system at the weapons laboratories to test the feasibility of a fully integrated, complex-wide approach.

Each year the national laboratories host many visitors and assignees from foreign countries under agreements for cooperation or on a scientist-to-scientist basis. These interactions are integral to the scientific process, but must be conducted according to sound security plans to prevent the inadvertent disclosure of classified or sensitive information. Last year, the Department issued an Order designed to improve physical and technology security and security awareness for the visits and assignments program. We are implementing this Order and results indicate objectives are being met. This is not to imply that we are completely satisfied, because more needs to be done. However, we are confident that the new requirements are clear and concise, and we will ensure that they are well understood. In the coming year, we will endeavor to ensure continuing improvements in the management of the foreign visits and assignments program at all DOE facilities.

TECHNOLOGY AND SYSTEMS DEVELOPMENT

Conducted at the national laboratories under Headquarters guidance, the Technology and Systems Development program is an integral part of Nuclear Safeguards and Security and provides the technology base for developing new systems required to sustain a viable safeguards and security program. The program's basic mission is to support the application of state-of-the-art technologies for protection of DOE facilities, property, classified matter, and SNM. The strategy is directed toward reducing risks and operational impacts. The Department's technology development program contributes to cost-effectiveness in all areas. Many benefits are realized through the use of technology to control manpower levels and through development of standardized systems. The use of new technologies to facilitate engineering design and specification for construction and equipment is also reducing our safeguards and security costs.

Continued fiscal constraints on the Nuclear Safeguards and Security Program are leading to a serious erosion of the technology base and expertise at the national laboratories. Unless the trend of the last several years is reversed, DOE will simply not have the technology available to improve our protection posture. The need is especially relevant to Departmental initiatives for modernization and plans for revitalization of the complex. We must strive to rebuild the safeguards and security technology base.

Identifying and addressing the technology development needs of the DOE community are important planning factors. Proposed projects are evaluated based on their potential to solve existing and future problems as identified by field offices and facilities. This provides emphasis for projects that offer potential, cost-effective solutions to known safeguards and security problems at multiple facilities. In addition to solving problems and improving safeguards and security capabilities, all proposed technology development projects are evaluated for their potential to reduce the operational outlay ("crosscut") estimates for safeguards and security. This provides incentive and leverage to improve both effectiveness and efficiency of the overall safeguards and security mission. Close coordination with the outlay programs is vital to accomplish this goal.

Disseminating the safeguards and security technology developed for the DOE complex to other Government agencies is also a high priority. We consider our DOE safeguards and security technology development program a unique national resource in assuring an awareness of technologies developed not only within the Department, but also in assuring awareness and coordination of technology development activities with other federal agencies. Exchange of information about safeguards and security technology is conducted through the dissemination of technical reports and manuals to appropriate audiences and end users and the conduct of training courses and workshops. We will continue to emphasize close interagency sharing and coordination to minimize costs and reduce redundancies.

We provide funding for the DOE classified computer security program through the Technology and Systems Development Program. A significant activity of the classified computer security program is the Center of Excellence for Computer Security at the Los Alamos National Laboratory. The Center provides support for the education and training of managers, computer security personnel, and information users. It also provides field support and conducts technology development for computer security.

INTERNATIONAL SAFEGUARDS

Our international safeguards program supports U.S. nonproliferation and national security objectives, as required by the Atomic Energy Act of 1954, the Nuclear Non-Proliferation Act (NNPA) of 1978, the Omnibus Diplomatic Security and Anti-Terrorism Act of 1986 and implementing Executive Orders and

Presidential directives. The primary objectives are to provide a sound technical basis for U.S. policies and to strengthen international safeguards and physical protection through technical support to the International Atomic Energy Agency (IAEA) and cooperative efforts with other nations. These initiatives, especially the DOE/OSS long-range technology development program for international safeguards, reflect the close technological relationship between domestic and international safeguards.

We will continue bilateral technical exchanges on physical protection technology, continue technology development for new and improved systems for IAEA safeguards and advanced safeguards technologies and procedures to improve the efficiency of IAEA safeguards inspectors, and conduct an international training course on international safeguards at the national level for foreign nationals.

CLASSIFICATION AND TECHNOLOGY POLICY

The FY 1991 request for the Classification and Technology Policy program, which is incorporated in the Nuclear Safeguards and Security program budget, is $8.1 million, exclusive of program direction. In FY 1991, we will continue to manage Defense Programs' technology transfer activities, but funding for these activities has been requested in the weapons research and development budget.

The Classification and Technology Policy mission is to develop and implement policy and procedures to identify classified and unclassified sensitive information critical to the national security, control nuclear related exports, and implement technology transfer policies for Defense Programs. The FY 1991 request will continue classification activities in program areas involving sensitive technologies, classification assistance to the Nuclear Regulatory Commission and the Department of State in matters pertaining to commercial uranium enrichment, implementation of automated systems to improve the effectiveness and efficiency of the classification program, education and training, classification appraisal program, and document review activities.

We have initiated a comprehensive classification policy study to determine if current DOE policies are adequate for the future, considering changing world conditions that are vastly different that those which existed in 1946 when the Atomic Energy Act was originally enacted.

Defense Programs has played a major role in developing and implementing nuclear export control policy to ensure compliance with U.S. national security and nuclear nonproliferation policy. We have been aggressively pursuing measures to control specific technologies that could assist a potential proliferant in the design or production of a nuclear explosive device. Events brought about by the political transition occurring in eastern Europe and the Soviet Union have increased pressure on the U.S. Government to identify those technologies and commodities which continue to pose a national security concern. We are involved in a major effort to revise international controls in the Coordinating Committee on Multilateral Export Controls (COCOM) and under International Atomic Energy Agency (IAEA) auspices to ensure international commerce will not undermine U.S. national security and nonproliferation interests. Similarly, we have a leadership role providing technical and policy expertise in support of the negotiation of major changes to existing international controls over nuclear fuel cycle components subject to international safeguards under the Zangger Trigger List.

At this time, I would like to recognize the Department's commitment to an aggressive program of technology transfer to U.S. industry. Defense Programs has a wealth of advanced technology that can be applied to strengthen the economic competitiveness of our country.

The recent enactment of the National Competitiveness Technology Transfer Act of 1989 amended the Atomic Energy Act to emphasize technology transfer as a mission of Defense Programs. We participated with other DOE elements in developing a strategy for implementing the legislation through a task force established by Deputy Secretary Henson Moore on January 31, 1990.

In FY 1990, we successfully developed and issued technology transfer guidelines and initiated two projects with industry. One project involves Departmental work with a consortium of eight U.S. companies to apply weapons program specialty metals technology for commercial uses. Technology in specialty metals will assist regaining U.S. competitiveness, provide domestic suppliers for weapons program metals and components, as well as keep the weapons program up-to-date with the latest technology. The second project is the Advanced Manufacturing Technology Initiative which will involve work with the National Center for Manufacturing Sciences. The National Center for Manufacturing Sciences represents over 100 U.S. companies involved in manufacturing. The area of machine tools is one particular part of manufacturing where we believe we can strengthen U.S. competitiveness by transfer of technology in an area targeted by our competitors. It is important to the weapons program since, in addition to assisting U.S. economic security, it will provide domestic suppliers for highly accurate machine tools needed for weapons production.

In FY 1991, we will continue to develop policy groundwork for implementing technology transfer in Defense Programs and cooperative agreements between the laboratories and U.S. industry. There will be a significant effort to evaluate project proposals and implement and monitor projects. In addition, we will continue the specialty metals consortium and the advanced manufacturing technology initiatives and plan to establish about six more technology transfer projects.

SECURITY INVESTIGATIONS

The FY 1991 request for personnel security investigations is $65.0 million. Security investigations are required by the Atomic Energy Act of 1954, as amended, and Executive Orders 10450 and 10865. The Department is mandated to use the Federal Bureau of Investigations and Office of Personnel Management (OPM) to conduct clearance investigations. The FY 1991 budget provides for 13,804 initial full-field investigations, 23,947 National Agency Checks, and 20,350 reinvestigations; and continued training for DOE hearing officers and personnel security specialists.

In 1986, we began a major initiative to reduce the numbers and levels of clearances, resulting in a 16-percent reduction of clearances from 209,000 to the current level of about 175,000. We have assured continued emphasis on this aspect of the program by requiring annual reviews and recertification of clearances for DOE and contractor employees, and other agency employees and contractors.

Mr. Chairman, let me emphasize the Department's commitment to reducing the security reinvestigations backlog. We have reduced the number of backlog reinvestigations from approximately 132,000 in 1985 to approximately 54,000 at the end of FY 1989. To keep pace with the 5-year reinvestigations requirement and continue to reduce the backlog, in FY 1990 we plan to conduct approximately 27,000 reinvestigations (of which 14,000 are contingent on proposed reprogramming action). The elimination of this backlog is essential so that we can ensure the integrity of our work force by maintaining current background data on our employees and removing individuals with derogatory information in their background from sensitive programs. We have been working with senior officials of the Office of Personnel Management (OPM) to insure that OPM is able to meet DOE needs for reducing the reinvestigations backlog. It is clear that OPM intends to make every possible effort to meet our needs contingent on Office of Management and Budget's approval of additional staffing.

One key component of our efforts to address the potential insider threat is the implementation of the Department-wide Personnel Security Assurance Program (PSAP) which will systematically monitor the reliability of selected DOE and contractor personnel. The PSAP is a special access authorization (security clearance) program for personnel who protect, transport, or have direct access to significant quantities of special nuclear material; operate nuclear material production reactors; or could cause grave damage to nuclear weapons production with the potential for significant impact on national security. The PSAP includes an annual supervisory review; medical evaluation, which includes a physical and alcohol dependency examination and a psychological assessment; management review, including drug testing; and security review.

The DOE PSAP Order was issued and a final rule, which has completed the public review process, is in the process of final approval for implementation within the Department. A training program, which has been field-tested, will be implemented for individuals included in the program. A total of $7 million will be used for approximately 3,000 Special Background Investigations in FY 1990 to get this program started.

S&S CROSSCUT ESTIMATE

The DOE outlay programs fund safeguards and security activities at the Department's field facilities. Total safeguards and security funding is identified in the Department's crosscut estimate, which is a summation of safeguards and security items in all the Department's program requests, including the Office of Safeguards and Security. The Department's total crosscut estimate for FY 1991 is $956 million, compared to $866 million in FY 1990. The Defense Programs' portion is $777 million in FY 1991, compared to $699 million in FY 1990.

As the Departmental coordinator, Security Affairs has a broad range of responsibilities for crosscutting activities which include ensuring that program budget submissions properly reflect safeguards and security considerations. We validate the need for safeguards and security improvements, evaluate proposed upgrade designs for adequacy, and verify the performance of the upgrades once they are in place. This process is critical, if we are to assure continued protection system progress in upgrading our critical facilities and effective safeguards and security integration. Significant progress has been and continues to be made toward increasing the level of protection of our facilities and the protection of DOE assets. A good portion of this has been accomplished through manpower-intensive, quick-fix measures. The validation of major construction projects designed to provide long-term, permanent corrective action to vulnerabilities is critical to assuring effective safeguards and security integration and the replacement of existing systems with more state-of-the-art hardware and software protective measures. When this is accomplished, our safeguards and security program will be well along toward achieving our objectives.

CONCLUSION

Mr. Chairman, members of the Committee, let me conclude today by stating that the Department continues its commitment to excellence in safeguards and security. The Department's ability to mitigate the potential outsider threat is at an acceptable level at our nuclear weapons facilities. We recognize that much remains to be done to mitigate the potential insider threat, and are taking actions to correct this problem. We will continue to work with the Congress to ensure that the protection of the Department's national security assets are given the highest priority.

STATEMENT OF VICTOR ALESSI

INTRODUCTION

Mr. Chairman and Members of the Subcommittee, I welcome this opportunity to present to you the activities of the Office of Arms Control, an organizational entity reporting directly to the Assistant Secretary for Defense Programs within the Department of Energy.

The Department has a deep, enduring and growing interest and involvement in a variety of current arms control activities. The Department's interest in arms control has expanded from its traditional interest and expertise in evaluating nuclear testing limitations to include the entire range of arms control negotiations.

MISSION

The Office of Arms Control is responsible for developing and coordinating the Department's positions, policies, plans, and procedures relating to the arms control process, and for verification technology development. Since the establishment of the Office we have been in a particularly exciting period of international arms control activity. Arms Control and related technology activities are proceeding at an unprecedented pace. The U.S. is negotiating across a broad range of arms control fora such as START, Nuclear Testing, Defense and Space, Chemical Weapons, Implementation of the INF Treaty, and Conventional Forces in Europe. The Department of Energy is involved in all of these fora.

ORGANIZATION

The Office of Arms Control is composed of two divisions: The Policy and Technical Analysis Division and the Systems and Technology Division. The Policy and Technical Analysis Division directs the development and coordination of DOE positions, policies, plans and procedures relating to arms control matters. It also is responsible for supporting interagency, intragovernmental, and international deliberations, negotiations, and treaty implementation activities. The Systems and Technology Division is responsible for developing technology and fabricating systems that will provide technical capabilities needed to verify compliance with existing treaties, treaties being implemented, treaties still in negotiation, and treaties under consideration.

Our activities are spread throughout the Department's national laboratory system. While the majority of the funding goes to the weapons laboratories because of the unique character of their nuclear expertise and their extensive experience in developing verification technologies, we have made a conscious effort to bring other DOE laboratories into the process of developing arms control verification technology.

FY 1991 FUNDING REQUEST

The Arms Control Program, along with the Intelligence Program, is funded under the Verification and Control Technology budget. The total Verification and Control Technology budget request for Fiscal Year 1991 is $174.0 million.

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Detection Technology

Under Detection Technology, research and development activities are funded as necessary to provide technical verification of compliance with arms control treaties. The research and development takes place primarily in the national laboratories, and is programmatically structured to support verification of treaties in effect, in negotiation, and under consideration. For example, we have developed or are developing systems to verify compliance with the Limited Test Ban Treaty, Threshold Test Ban Treaty, Peaceful Nuclear Explosions Treaty, and Intermediate Range Nuclear Forces Treaty as well as a future Strategic Arms Reduction Treaty, Chemical Warfare Treaty, Conventional Forces in Europe Treaty and the Open Skies initiative. The range and scope of the technologies necessary to support verification of these diverse treaties must be broad and sophisticated. For example, instrumentation is being developed to operate in seismic boreholes; to operate on geostationary satellites; to cover signals with frequencies from fractions of a hertz to those of gamma rays; to measure masses as small as one millionth of a millionth of a thousandth of a gram; and to measure energies equivalent to that released by the explosion of a thousand-million pounds of TNT. Our verification requirements involve a wide range of capabilities many of which are unique. We have organized our Detection Technology Program into four functional areas: (1) On-site Verification; (2) Regional monitoring; (3) Remote Sensing; and (4) Advanced Concepts/Technology Development.

On-Site Verification activities are composed of systems and technologies that are used to monitor treaties with the cooperation of the inspected party. An example of on-site activity in which our verification systems were used, was the recent Joint Verification Experiment during which we measured the yield of a Soviet nuclear explosion by using a Department of Energy developed system called Continuous Reflectometry for Radius versus Time EXperiment (CORRTEX) at the Semipalatinsk Test Site. This CORRTEX system will be used for monitoring some tests once the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty are completed and ratified.

Regional Monitoring activities include developing seismic systems and data processing capabilities that we could deploy within the Soviet Union. Toward that objective, we have fabricated the Deployable Seismic Verification System (DSVS). The first five units are now available for deployment within the U.S.S.R. in a cooperative mode. We have also designed and fabricated the Configurable Seismic Monitoring System (CSMS) should the negotiations specify the use of a portable non-permanent seismic system.

Remote Sensing activities have been in place for over a quarter of a century.

An example of our verification efforts in this area is the satellite instrumentation effort for worldwide monitoring of the Limited Test Ban Treaty. This capability which consists of the sensors and systems for detection of nuclear detonations (endo- and exo-atmospheric as well as in deep space) is a major element of the Remote Sensing activity. The other major element is the development of new satellite sensing techniques that cover portions of the electromagnetic spectrum beyond the visible region.

In the Advanced Concept/Technology Development activity we try to extend the frontiers of science and technology in ways that would be useful for future verification needs. This is where we test the technical feasibility of new ideas, develop technologies that might be applicable to more than one treaty regime, and fabricate systems for the technical intelligence collection community. Several technologies, such as tagging, are showing promise for ensuring effective verifiability of treaties being negotiated such as the Chemical Warfare Convention (CWC) and the Strategic Arms Reduction Treaty (START).

It is important to emphasize the versatility and quality of the technical support we receive from the national laboratories. We consider the technical expertise, which has evolved from the nuclear weapons programs at the laboratories, to be a national asset in terms of arms control verification technology development. While we have attempted to maintain a stable level of resource allocations to the laboratories, we have also planned our activities in a way that allows us to begin and complete explicit projects in an orderly and efficient manner. To this end we have developed a five year plan for each of our projects, including a statement of work, milestones, and deliverables. We believe that, because of our ability to tap the resources of technical expertise at the national laboratories, we at the DOE's Office of Arms Control have a unique capability to apply that expertise to all of the Nation's arms control treaty verification needs. By handing over completed projects to those who will use the systems and technologies in the implementation of treaty verification, we are able to keep DOE's activities continually pushing the state-of-the-art in research and development, while leaving operations to those who are assigned that responsibility. In this way we have minimized duplication and enhanced cooperation and coordination with other organizations.

One of the more difficult tasks is the selection of those projects which may improve verification capability for future arms control treaties not yet being negotiated. Since policies may change as a result of public, fiscal, or congressional activities, or international events, and since technology development may take up to ten years, we believe it is prudent to have long term technology development in support of generic requirements. For this reason we are developing future technologies which are not directly related to current U.S. arms control policies and initiatives. For arms control agreements now being negotiated where the verification requirements are better defined we are drawing upon existing technology and adapting it to meet those requirements.

Analytical Support

The Analytical Support activity is managed by the Policy and Technical Analysis Division. The Department has a major and increasingly important interest in the pursuit and outcome of ongoing arms control negotiations. This is most evident with regard to nuclear testing and weapons where the Department and its national laboratories actively participate in the international negotiating process and are directly affected by resulting treaties, protocols, and implementing procedures. In addition, we are involved in analytical support for the full spectrum of arms control treaties being negotiated. It is essential that preparation for negotiations involve thorough analysis of the options available to the U.S. including assessment of their impact on U.S. and allied security postures and of their effective verifiability.

In addition to Department representation in interagency and international arms control activities being conducted under the heading of Analytical Support, supporting studies and analyses are also conducted under this budget category. An effort that illustrates how analytical studies support DOE's participation in arms control negotiations and policy development is the planning and conduct of exercises and mock challenge inspections at sensitive Department facilities. These exercises advance on-site inspection readiness, planning capabilities, and assist the verification inspection process. We are evaluating the relative merits of alternative approaches to inspections and sharing the results with other departments and agencies. Another example of analysis involves studies on potential future treaty warhead dismantlement provisions and alternative disposition of derived special nuclear materials.

Although DOE contributes across the spectrum of arms control activities, several arms control tasks are uniquely DOE's. For example, we must make test limit negotiation positions consistent with U.S. nuclear deterrent needs.

Construction

Finally, to support various efforts in verification and control technologies, we need a facility that will serve as a focus for related technical activities in national security and arms control. Accordingly, we are requesting $10,000,000 in FY 1991 to continue work beginning in FY 1990 on the Center for National Security and Arms Control at Sandia National Laboratories in Albuquerque. This facility will support systems analysis, advanced concepts, ground-based verification, satellite monitoring, intelligence, and threat and countermeasures activities. It is the only designated arms control facility in the Defense Complex of the Department of Energy.

I should point out that our request does not support implementation of any on-site verification activities in the Soviet Union, which could result from the entry into force of the Threshold Test Ban Treaty and Peaceful Nuclear Explosions Treaty. In addition, new arms control initiatives may require adjustments and additions to programs to develop verification systems.

In conclusion, we feel that these are exciting times in the arms control arena and the Department is moving vigorously and forcefully ahead in applying the technical expertise residing at the national laboratories to the verification challenges of this arena.

STATEMENT OF ROBERT J. WALSH

INTRODUCTION

Mr. Chairman and members of the Committee, I am Robert J. Walsh, Associate Director for the Office of Intelligence (OI) that reports directly to the Office of the Secretary of Energy.

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It is my pleasure to provide this statement regarding The Department of Energy's Intelligence Programs with particular focus on the FY 1991 budget request for the Analytical Support/Intelligence, Threat Assessment, and Counterintelligence program elements.

It will come as no surprise to you that DOE's intelligence activities have been severely challenged during the past year. In addition to the Department's traditional intelligence interests, Secretary Watkins has expanded its role in support of Departmental initiatives and national policies to include the development of a comprehensive National Energy Strategy, safe and environmentally sound disposal of radioactive waste, strengthening the domestic energy industry's ability to compete in the international marketplace, and improving our understanding of the potential global climate change.

Meanwhile, the evolving relationship with the Soviet Union, the Warsaw Pact, and our allies has demanded significant alterations in the focus and emphasis of nuclear related and scientific and technical intelligence. They have also indicated the importance of having a strong counterintelligence program.

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MISSION

The Foreign Intelligence, Threat Assessment, and Counterintelligence missions under the Office of Intelligence are fixed by statute (e.g., the Atomic Energy Act of 1954, the Department of Energy Organization Act of 1977), executive order (e.g., Executive Order 12333, "United States Intelligence Activities"), and policy responsibilities resting in the Department of Energy.

The OI is a Department-wide support organization, providing intelligence and threat assessment support to the various elements throughout the Department. In addition, OI staff personnel represent the Department through membership on various Director of Central Intelligence level groups,

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OI personnel also represent the Department on various Interdepartmental Groups on terrorism and counterintelligence.

Analytical Support - Intelligence

The mission of the Department's Foreign Intelligence program is driven primarily by Executive Order 12333. The DOE is tasked by this order to produce and disseminate foreign intelligence necessary for the Secretary of Energy's responsibilities; provide expert technical, analytical, and research capability to the Intelligence Community (IC); formulate intelligence collection and analysis requirements where expert capability of DOE can contribute; and participate with the Department of State in overtly collecting information with respect to foreign energy matters. Substantive elements of the intelligence program include weapons intelligence, proliferation intelligence, foreign technologies assessments, foreign space applications, and energy resources intelligence.

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As I have mentioned, Secretary Watkins is using intelligence in new ways in DOE. He has requested the publication of a National Intelligence Estimate to form the international context for a comprehensive National Energy Strategy;

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and we are enhancing our analysis of nuclear reactor safety issues. We expect to continue to identify similar requirements.

Meanwhile, the nature and scope of the Department's longstanding intelligenc analysis programs will need to be altered by rapidly changing international events,

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International events that affect production, inventories and consumption of fossil fuels, in conjunction with economic developments dictated by market conditions or the Organization of Petroleum Exporting Countries, must be fully assessed in terms of impact on the U.S. Strategic Petroleum Reserve and the overall U.S. energy posture.

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Threat Assessment

The mission of the Threat Assessment program is to provide assessments of hostile threats to the Department's facilities and conduct a special technology research and development (R&D) program *Deleted*

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The Office of Threat Assessment (OTA), which was initially established in 1986, consolidates the DOE threat analysis activities within a single office. OTA provides a "fusion center" where foreign intelligence and domestic information can be combined to provide a comprehensive review and timely assessment of actual or potential threats to DOE facilities and programs. DOE policy and decision makers, and all DOE and DOE-supported operations are provided with timely intelligence on actual and potential adversaries throughout the United States.

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COUNTERINTELLIGENCE

The mission of the Counterintelligence (CI) program is to develop, conduct, and oversee a Department-wide CI program. The program is conducted in coordination with the U.S. Intelligence Community to counter (identify and neutralize) the espionage and related foreign intelligence services threats to DOE national security facilities and programs, and DOE and DOE-contractor personnel.

The program assists in establishing and monitoring CI programs in DOE field facilities, serves as the focal point for liaison with the CI elements in the U.S. Intelligence Community, performs CI analyses of issues affecting the security of DOE and its field facilities, promotes and assists in organizing CI awareness training for DOE Headquarters and field elements, and develops and manages offensive counterespionage activities. The increasing numbers of exchanges and dialogues with the Soviet Union and Warsaw Pact nations has escalated dramatically the opportunities for hostile intelligence services to target DOE facilities. Hence, the challenge will be to be both responsive to the need for data exchange while maintaining the security of information vital to national defense.

1991 FUNDING REQUEST

The FY 1991 budget request for Foreign Intelligence, Threat Assessment, and Counterintelligence activities *Deleted* represents an increase *Deleted* *Deleted* over the FY 1990 funding level. *Deleted* $2.6 million is for initiation of construction activities for the Foreign Technology Assessment Center at the Lawrence Livermore National Laboratory and the remainder is designed to provide the Department with the improved capabilities needed to respond to the changing Departmental requirements and world events.

Analytical Support - Intelligence

The FY 1991 budget request *Deleted* supports a wide range of ongoing nuclear related foreign intelligence activities for which the DOE is responsible.

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The funding also supports foreign intelligence programs on advanced technologies *Deleted* *Deleted* Funds also support assessments of foreign energy supply programs (e.g., oil, gas, electricity, etc.) *Deleted* *Deleted*

In addition, the FY 1991 budget request supports new/expanded activities consistent with the Department's expanded role for intelligence and additional Intelligence Community requirements.

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THREAT ASSESSMENT

The FY 1991 budget request of $11.7 million supports the Threat Assessment and Special Technology programs.

The Communicated Threat Credibility Assessments program provides assessments of nuclear extortion threats, conventional threats against DOE facilities, and actual or potential black market transactions in nuclear material. The budget request is to maintain the program at the existing level of effort.

The Programmatic Threat Assessment program provides a continuous review and assessment of real or potential threats to DOE programs and facilities. This program provides for: coordination of information requirements with appropriate Federal, State, and local government organizations; maintaining and implementing appropriate DOE directives, regulations, and procedures governing information collection, analysis, storage, and dissemination (these activities are carried out in consultation with the DOE General Counsel and the Department of Justice); and preparation and dissemination of finished analyses that are used in support of specific operations (e.g., nuclear material movements) and to provide information for use by those responsible for security and implementation. In addition, the OTA coordinates a threat assessment infrastructure within the DOE Headquarters and field elements and coordinates a nuclear terrorism education program for the Intelligence Community. The budget request provides for strengthened local/regional programs by expanding the threat assessment infrastructure into areas not presently covered.

The Special Technology program applies the unique expertise that exists within the DOE laboratories and contractors to assist in the counterterrorism efforts of the Department, the Intelligence Community, and other Federal agencies.

DOE efforts are coordinated with the Terrorism Intelligence Community and with the Intergovernment Group on Terrorism. The budget request will maintain the program at the existing level of effort.

COUNTERINTELLIGENCE

The FY 1991 funding request for the counterintelligence *Deleted* *Deleted* The counterintelligence program provides centralized management and structure and strengthens the Department's capability to identify and neutralize espionage directed at DOE programs vital to U.S. national security.

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The FY 1991 budget request supports the continued devlopment of the DOE-wide program designed to detect, deter, and defeat the ongoing espionage threat from foreign intelligence services to DOE facilities, programs, and personnel.

The additional funds will be used to support the continued development and offer additional sessions of the DOE Counterintelligence Awareness Training program; *Deleted* and upgrade Headquarters counterintelligence assistance to DOE field facilities.

FOREIGN TECHNOLOGY ASSESSMENT CENTER

The FY 1991 request contains $2.6 million to commence construction of the Foreign Technology Assessment Center at the Lawrence Livermore National Laboratory. The total estimated cost is $20 million. The Center is urgently needed to house *Deleted* programs currently, and unacceptably, located in temporary facilities throughout the laboratory. The Center will greatly enhance the ability to accomplish *Deleted* program objectives.

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The Foreign Technology Assessment Center will serve as a national asset and foster the furthance of *Deleted* national security efforts in support of DOE and national policies.

PROGRAM DIRECTION/STAFFING

The FY 1991 budget request *Deleted* provide salaries, personnel benefits, and travel expenses

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CONCLUSION

It has been my pleasure to provide to you this overview of the DOE intelligence programs and to outline our FY 1991 budget request. As always, if I can be of further assistance in providing additional details on DOE intelligence programs, I will be pleased to meet with you or your appropriate staff personnel at your convenience.

OPENING REMARKS

Dr. KNUTH. I would like to thank the Senate Appropriations Committee for your continued support. Your actions have helped us change the culture at DOE and set a new course for the future.

Senator McClure, since you have announced that you will not seek reelection, I want to specifically thank you and express the sincere gratitude of everyone within defense programs for the excellent support you have provided us. The advice and ideas you provided us during a time of intense national debate and critical commentary concerning the Nation's nuclear weapons programs helped us in our mutual commitment to our Nation's defense. Your wisdom aided us in making vital and timely improvements, while accommodating the requirements and concerns of the executive branch and Congress. Your devoted efforts and strong support have been a mainstay in the success experienced by defense programs in enhancing the defense and security of this Nation and its allies.

Senator McCLURE. I'm very sorry this is a closed hearing. [Laughter.]

But I do thank you.

Dr. KNUTH. On behalf of the Department of Energy, we wish you good health and happiness in your future endeavors.

Senator McCLURE. Thank you.

DEFENSE PROGRAMS BUDGET REQUEST

Dr. KNUTH. Now I would like to offer some perspectives on the changing world scene, discuss the defense programs mission, address the challenges we are facing, and close with a discussion of the defense programs budget needs.

As the Congress is well aware, the world is in a state of flux. The threat from conventional forces is diminishing. However, the Soviets still possess a formidable arsenal of strategic weapons. They continue to develop and deploy a growing number of new and improved missile delivery systems. Their production of nuclear materials continues unabated, [deleted]. In today's unstable environment, we need to maintain the capability to respond to a variety of threats while negotiating with the Soviet Union for an orderly reduction in the numbers of strategic systems.

We have learned an important lesson in this country. For nuclear deterrence to be successful, it must be achieved in a safe and environmentally acceptable manner. This Nation cannot afford to meet production requirements at the expense of safety and environment.

DEFENSE PROGRAMS MISSION CHART 1

o SUPPORT NATIONAL SECURITY POLICIES OF THE UNITED STATES FOR A NUCLEAR DETERRENT

  - CONDUCT ALL OPERATIONS IN A SAFE, SECURE AND ENVIRONMENTALLY RESPONSIBLE MANNER
  - CONDUCT RESEARCH AND EXPERIMENTS ON THE MILITARY APPLICATION OF ATOMIC ENERGY
  - PRODUCE AND MAINTAIN NUCLEAR WEAPONS AND NUCLEAR MATERIALS, AND MANAGE GENERATED WASTE
  - ASSESS FOREIGN NUCLEAR WEAPONS CAPABILITIES AND COMPLIANCE WITH TREATIES
  - PROVIDE SAFEGUARDS AND SECURITY FOR NUCLEAR WEAPONS, DEVICES, MATERIALS, FACILITIES, AND INFORMATION

MISSION

The Department of Energy's defense programs mission, shown in the first slide, contributes to the national security by supporting the development, production, and maintenance of a credible, safe, and reliable nuclear deterrent. Defense programs oversees the manufacture, maintenance, and retirement of weapons components and nuclear materials comprising our nuclear stockpile. Significant efforts are directed toward assuring that the Department's nuclear weapons, materials, facilities, and classified information are adequately protected. Defense programs has arms control efforts directed at the research and development of new verification technologies, studies, and analyses to support the arms control process and efforts to analyze our adversaries' capabilities.

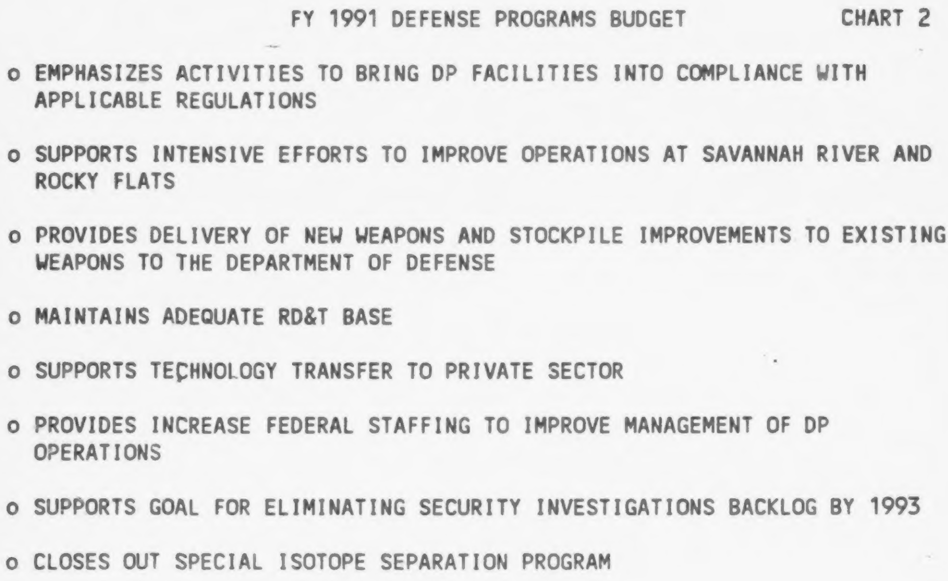
Our Nation's ability to produce nuclear materials in support of our defense responsibilities has been severely limited, due almost entirely to environmental, safety, and health problems. The problems are the result of a culture which placed the highest priority on production. Facilities throughout the defense complex had been allowed to deteriorate with no firm, integrated, comprehensive plans for their modernization. Lessons learned in the civilian nuclear power industry had been ignored. Oversight of contractor activities has been inadequate and, in some cases, conducted by personnel not possessing the requisite scientific, managerial, and technical skills to oversee these highly complex activities.

REORGANIZATION

We have initiated a major reorganization within defense programs to establish clear and direct lines of management responsibility. The managers of the Savannah River Operations Office and the Rocky Flats Office now report to the Assistant Secretary for defense programs. Additionally, the headquarters element has been realigned to provide added resources, clearer lines of authority, and enhanced capability to oversee field operations.

The recent increase in Federal pay, effective in January 1991, will provide some relief in acquiring personnel with the sorely needed technical skills to manage the Department's defense programs. However, we still need congressional support to enable scientists and other highly qualified individuals in the national laboratories or retired from the military to serve in the Department of Energy without jeopardizing their existing financial benefits.

On June 27, 1989, Secretary Watkins announced a 10-point plan to move the Department aggressively toward full accountability and compliance with environmental, safety, and health requirements. Details of the plan, as well as future initiatives, are contained in Secretary Watkins' posture statement and budget overview for the Department of Energy, which was provided to each Member of Congress.



FY 1991 DEFENSE PROGRAMS BUDGET CHART 2

- EMPHASIZES ACTIVITIES TO BRING DP FACILITIES INTO COMPLIANCE WITH APPLICABLE REGULATIONS
- SUPPORTS INTENSIVE EFFORTS TO IMPROVE OPERATIONS AT SAVANNAH RIVER AND ROCKY FLATS
- PROVIDES DELIVERY OF NEW WEAPONS AND STOCKPILE IMPROVEMENTS TO EXISTING WEAPONS TO THE DEPARTMENT OF DEFENSE
- MAINTAINS ADEQUATE RD&T BASE
- SUPPORTS TECHNOLOGY TRANSFER TO PRIVATE SECTOR
- PROVIDES INCREASE FEDERAL STAFFING TO IMPROVE MANAGEMENT OF DP OPERATIONS
- SUPPORTS GOAL FOR ELIMINATING SECURITY INVESTIGATIONS BACKLOG BY 1993
- CLOSES OUT SPECIAL ISOTOPE SEPARATION PROGRAM

DEFENSE PROGRAMS BUDGET REQUEST

The Department's fiscal year 1991 defense programs budget request of $7.5 billion has been structured, as shown in the next slide.

I won't read over these items. They are listed on the slide and are provided to you in your handouts.

The $7.5 billion budget request for the Department's defense program in fiscal year 1991 represents an 11-percent increase over the fiscal year 1990 appropriation. This next chart compares the fiscal year 1991 funding request to the fiscal year 1990 appropriation for each program.

DEFENSE PROGRAMS
FY 1991 REQUEST
(DOLLARS IN MILLIONS)

CHART 3

	FY 1989 APPROP.	FY 1990 APPROP.	FY 1991 REQUEST
RESEARCH, DEV. AND TESTING	$1,839	$1,864	$1,885
PRODUCTION AND SURVEILLANCE	2,104	2,375	2,757
PROGRAM DIRECTION	83	99	106
NUCLEAR MATERIALS PRODUCTION	1,943	2,092*	2,413
VERIFICATION AND CONTROL TECH.	155	166	174
SAFEGUARDS AND SECURITY	79	85	91
SECURITY INVESTIGATIONS	43	41	65
SUBTOTAL DEFENSE PROGRAMS	$6,246	$6,722	$7,491
(% CHANGE)			(+11.4%)

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* INCLUDES $135 MILLION FROM DOD

DEFENSE PROGRAMS
SUMMARY OF CHANGES FROM FY 1990
(DOLLARS IN MILLIONS)

CHART 4

FY 1990 CONGRESSIONAL APPROPRIATIONS	$6,722
ESCALATION	+ 280
SAVANNAH RIVER OPERATIONS	+ 338
ROCKY FLATS INITIATIVE	+ 155
INCREASED SECURITY INVESTIGATIONS	+ 23
WEAPONS TRANSPORTATION SAFEGUARDS INITIATIVE	+ 20
INCREASED FEDERAL STAFFING	+ 14
MONSANTO PARTIAL CONTRACT SETTLEMENT	+ 23
WEAPONS RD&T	- 63
SIS CLOSEOUT	- 56
BASE PROGRAM (MAINTENANCE/SAFETY & HEALTH/ETC)	+ 35
FY 1991 CONGRESSIONAL REQUEST	$7,491

Consistent with the Department's changing priorities, the next slide presents the areas of major funding changes from fiscal year 1990 to fiscal year 1991. The largest increase, $338 million, is for continuation of reactor safety and support facility improvements at the Savannah River site.

The fiscal year 1991 budget request also provides an additional $155 million for operational improvements at Rocky Flats. Of significant concern is the fact that, in order to meet the high priorities of Savannah River and Rocky Flats, the weapons research, development, and testing program could not be supported at the desired level.

This program element, which represents the base upon which our nuclear deterrent is founded, as well as much of our investment in the future, must be supported.

REPROGRAMMING OF FISCAL YEAR 1990 FUNDS

I wish to discuss briefly with you the need for your immediate support of the fiscal year 1990 defense programs reprogramming request forwarded to you in the February reprogramming. That was a $291 million reprogramming from within the atomic energy defense activities appropriation, and also to transfer $135 million from the Department of Defense to the Department of Energy. This will enable the Department to continue efforts to upgrade the Savannah River reactors for restart, continue the defense production complex on an approach toward achieving compliance with applicable regulations, strengthen security production, improve and broaden Federal management oversight, and place the N Reactor at Richland, WA, in a dry, standby status. Your favorable action on this request will allow us to move expeditiously on these important actions.

Over the last year, we have established new goals, initiated a major change in the DOE culture, and developed new budget plans to achieve our objectives. Our efforts to correct deficiencies within the Department are, at long last, bearing results.

FY 1990/1991 CONCERNS

CHART 5

- TIMELY RESTART OF SAVANNAH RIVER
- RESUMPTION OF OPERATIONS AT ROCKY FLATS
- ABILITY TO MEET DOD REQUIREMENTS
- NEW REQUIREMENTS FROM TIGER TEAM INVESTIGATIONS
- FUNDING FOR FUTURE VERIFICATION REQUIREMENTS
- DOWNWARD TREND IN RESEARCH, DEVELOPMENT AND TESTING

RISKS AND UNCERTAINTIES

We have concerns, and there are risks associated with accomplishing our objectives on schedule. While we believe the Savannah River reactor restart schedule will be achieved, there are concerns associated with the timely resumption of operations at Rocky Flats and our ability to meet the future Department of Defense requirements.

Other uncertainties for which funding has not been included in our fiscal year 1991 budget request are the unknown requirements which may be identified by our Tiger Team investigations and arms control treaty verifications which are not in place today. We are also concerned about the continued downward trend in our weapons research, development, and test program.

In the present time of major change, the weapons research, development, and test program represents our ability to respond to changes and to maintain the fundamental capabilities which must be supported.

I look forward to working with the Congress to secure the necessary resources and support to carry out effective and completely the Department's important mission.

At this time, I would be pleased to answer any questions you may have or to permit Dr. Barker, from the Department of Defense, to make his oral statement.

Thank you.

Senator JOHNSTON. Why don't we proceed with Dr. Barker and then we will ask questions.

STATEMENT OF ROBERT B. BARKER, ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY), DEPARTMENT OF DEFENSE

Dr. BARKER. Thank you.

Senator Johnston, Senator McClure, thank you for having me here.

The Department of Defense supports the atomic energy defense activities budget that has been presented to you today. I am here as the Assistant to the Secretary of Defense and as Executive Secretary and Staff Director of the Nuclear Weapons Council [NWC] to make a few remarks in support of that statement.

NUCLEAR WEAPONS COUNCIL PERSPECTIVE

With the understanding that my full statement will appear in the record, let me summarize it in rather brief form.

The nuclear weapons production called for in the fiscal year 1991 budget just discussed will allow nuclear weapons with the most modern of safety and security features to replace those weapons built in an earlier era and provide warheads for the sea-launched cruise missile and the Trident II missile.

The Department of Energy's request also supports the research and development efforts upon which we, the Department of Defense, will depend for the nuclear weapons concepts which will maintain a credible nuclear deterrent for the foreseeable future. A robust nuclear test program is critical to this continuing research and development effort.

In fiscal year 1991, we look to DOE to support national security requirements by developing the modern 155 mm artillery shell, the W82; the W89 warhead for the strategic short-range attack missile, known as SRAM II; the B-90 nuclear depth/strike bomb, which will enable us to replace the aging B-57 nuclear depth/strike bomb; and a warhead for a tactical air-to-surface missile, known as SRAM T; and a warhead for the missile to replace the existing Lance missile, known as the Follow-on to Lance.

None of these functions that I've just mentioned can be carried out without a DOE complex which can operate safely while ensuring that the environment remains healthy. Recent shortcomings in these areas have resulted in plant shutdowns, which have, in turn, meant that the Department of Defense's requirements have not been met. The Rocky Flats situation alone will cause the loss of [deleted] of the production which had been expected for fiscal years 1990 and 1991.

This has meant a slowdown in the introduction of modern safety and security features into the stockpile.

In the aftermath of the Savannah River site shutdown, the United States has met its tritium requirements by [deleted]. Full funding of DOE's budget is also needed to restore these facilities to operation and to keep all other elements of the complex in operation.

We're going to need new tritium as long as we have nuclear weapons. The new production reactor program, about which you will hear more later, is necessary to ensure that we will have a reliable supply for our deterrent into the next century.

WEAPONS SAFETY COMMITTEE

The Nuclear Weapons Council has continued in operation during the last year, and has fulfilled all of the functions required of it by the Congress when it established the Nuclear Weapons Council. One particular item of note that I will mention briefly here is that in the last year, the Nuclear Weapons Council, in view of the importance of weapons safety, has established a committee specifically for that purpose, that has equal Defense and Energy representation, and is designed to ensure that safety issues reach the attention of the Nuclear Weapons Council members directly, without any filtering by other institutions of either Department.

Rear Admiral Barr is the Chairman of that particular subcommittee of the Nuclear Weapons Council, known as the Weapons Safety Committee.

When I first testified to this group in 1987, I told you that I would annually provide you a status of the stockpile.

STOCKPILE STATUS

So, let me spend a few moments today doing that. It appears starting on page 11 of my full testimony.

At the end of December 1989, the stockpile held [deleted] than in the previous year or a total of [deleted] warheads. The total yield of that stockpile was slightly less than [deleted]. I remind you that back in 1960, the yield of that stockpile was in excess of [deleted]—a dramatic reduction in that 30-year period.

The largest warhead in the inventory continues to be the [deleted] each [deleted] having a yield of [deleted].

Senator Johnston. This would mean that the average is about [deleted].

Dr. **Barker**. Yes; I'm sure your arithmetic is right, Senator. But as you will see, as I'm going to tell you in a moment, the spectrum is quite large—from [deleted] at the largest, down to the [deleted] which has a yield of [deleted].

The oldest warhead type in the inventory continues to be [deleted].

Senator **Johnston**. Is that with enriched uranium or plutonium?

Dr. **Barker**. Both, sir. The [deleted] that I mentioned, the [deleted] is the only one of the very older weapons in the inventory that does not have plutonium. That is an all-uranium system. The rest of these systems all have used plutonium in the primary. [Deleted.]

The Admiral just whispered to me, very accurately, that the 8-inch artillery shell is also another weapon in the inventory that only [deleted].

AVERAGE AGE OF THE STOCKPILE

The average age of the warhead in the stockpile has made the most dramatic change since I have been in my job. At the end of 1989, [deleted] and 1 year earlier, [deleted]. In the last 3 years, when I've made these statements to you, the decrease in age has been almost invisible. We have not been modernizing as rapidly as some might think, if you take a look at the average age of the weapons in the stockpile.

We have 25 different nuclear weapon designs in the inventory. In the next 3 years, we are going to retire [deleted] those 25. We are going to replace them with [deleted] new types.

RETIREMENTS

So, for the foreseeable future, we're going to have about 25 different weapon types in the stockpile. Those which are being retired are the [deleted] the [deleted]. The [deleted] warheads that are being retired because of the INF Treaty are the W84 warhead for the GLCM and the W85 warhead for the Pershing II, and, in addition, the [deleted] that I spoke of a moment ago. They will all be gone in the next 3 years.

We told you when we first announced the retirement of these warheads that we would [deleted].

INF TREATY

Senator **McClure**. And there is no change in that program in light of the Soviet violations of INF provisions?

Dr. **Barker**. None, sir. I think you will find that the State Department and the Arms Control and Disarmament Agency have not concluded that the recently found SS–23's constitute a legal violation of treaty obligations.

Senator **McClure**. Thank you for your very careful statement. [Laughter.]

Dr. **Barker**. But the Department of Energy came to the Department of Defense several months ago and identified for us [deleted].

Senator **Johnston**. By the way, is there any significance in the use of the letters "W" and "B"?

Dr. **Barker**. "B" is for laydown bombs and "W" is for everything else.

I said that at the same time we retired these [deleted] older weapon types we would be introducing [deleted] newer types into the stockpile. Very briefly, those are the W82, the 155 mm artillery shell; the W89 warhead for SRAM II, which will finally enable us to retire the W69 SRAM–A warhead, the only nonsensitive high-explosive warhead that still sits on alert bombers. We place a very, very high priority on getting the W69 out.

Senator **Johnston**. It's the one that can blow up in the event of a fire in the B–52.

Dr. **Barker**. And scatter plutonium; yes, sir.

Senator **Johnston**. And we're still using those?

Dr. **Barker**. Are we still using SRAM–A's? Yes, sir. They are a very critical element of the role of the penetrating bomber. The bomber literally cannot perform its function in the Triad without these weapons that are capable from standing off from well-defended targets and delivering the short-range missile against the target.

Senator **Johnston**. Well, you are in the process, then, of replacing those?

Dr. **Barker**. As soon as the W89 SRAM II warhead is produced, they will go into the new SRAM II missile, which, again, we have to keep on track so that this replacement can take place. The objective is to begin replacing those missiles. I should check this for the record, but I believe the first missiles would be deployed in the 1995 timeframe. Our objective is to have all SRAM–A's off aircraft by [deleted]. This is a commitment that the two Departments have made at the highest level—to get those SRAM–A's out as rapidly as they can be replaced by a comparable capability.

NEW WEAPONS

The other three new weapons that will be introduced into the inventory are the B–90 nuclear depth/strike bomb, which will replace the B–57 nuclear depth/strike bomb—same function, but we're going to have a modern weapon, insensitive high explosive, and modern safety and security features. The W61 weapon, which will be a new warhead for a [deleted].

Admiral **Barr**. That's right.

Senator **Johnston**. And [deleted] can be more effective than——

Dr. **Barker**. Than [deleted].

Senator **Johnston**. This is the [deleted].

Dr. **Barker**. Yes; the [deleted].

Senator **Johnston**. How do you get [deleted].

Dr. **Barker**. Actually, it is a bomb. The B–61 is the bomb from which the W61 warhead is derived. Again, it is a tremendous accomplishment at the Department of Energy laboratories and the Sandia Laboratories, who have several decades of history in examining the concept [deleted].

Senator **Johnston**. It's got a missile on it [deleted].

Dr. **Barker**. Right; in addition.

Senator **Johnston**. It's not a gravity bomb?

Dr. **Barker**. No; it's not. The last of the new weapon systems in the next 3 years is the B–61 [deleted] bomb. I am sure that you, like I, lose track of the different "flavors" of the B-61, of which there are [deleted]. But I am sure Admiral Barr will straighten us out on this.

That's a bit of a dirty trick. There are few people who, off the top of their heads, can tell you the difference between the different versions of the B-61.

STOCKPILE SUMMARY

In summary, then, average age continues to go down, as it has gone down in the last 2 years. We still have enough weapons out there. There are still a lot of weapons that we would like to replace with modern safety and security features. Let me skip over the balance of my statement, which you will have for the record, and summarize by saying that we believe that deterrence is, and will remain, critical to U.S. national security. To maintain deterrence, DOD will depend upon a strong Department of Energy for defense program activity.

Continued modernization of both our strategic and nonstrategic nuclear forces is essential. A safe, secure, and effective nuclear deterrent requires a modernized nuclear weapons complex, capable of operating safely and with a minimum environmental disturbance.

The nuclear weapons complex must be again functioning at full capacity in the near future or our defense capabilities will be compromised.

That concludes my remarks.

[The statement follows:]

STATEMENT OF ROBERT B. BARKER

INTRODUCTION (U)

(U) Mr. Chairman, and members of the Committee, I am pleased to once again appear before the Committtee to present the views of the Department of Defense (DoD) in support of the Department of Energy's (DOE's) proposed Atomic Energy Defense Activities Budget. As the Assistant to the Secretary of Defense (Atomic Energy), and Staff Director of the Nuclear Weapons Council (NWC), I can inform you that the Defense Department supports the Atomic Energy Defense Activities Budget that insures that a reliable stockpile is maintained and our Country's strategy of deterrence is upheld.

(U) The nuclear weapons production called for in this FY 1991 budget will allow nuclear weapons with the most modern of safety and security features to replace weapons built in an earlier era, and provide warheads for the Sea Launched Cruise Missile and TRIDENT II missile. The Department of Energy's (DOE) budget also supports the research and development efforts upon which we depend for the nuclear weapons concepts which will maintain a credible nuclear deterrent for the foreseeable future. A robust nuclear test program is critical to this research and development effort. In FY 1991, we look to DOE to support national security requirements by developing: the modern 155mm artillery shell, the W82; the W89 warhead for strategic short-range, attack missile SRAM II; the B90 depth/strike bomb to replace the aging B57 bomb; a warhead for the tactical air-to-surface missile; and a warhead for the missile to replace the existing LANCE missile.

None of these functions can be carried out without a DOE complex which can operate safely while ensuring that the environment remains healthy. Recent shortcomings in these areas have resulted in plant shutdowns which have, in turn, meant that the *Deleted* *Deleted* The Rocky Flats situation *Deleted* of the production which had been expected for FY 1990 and FY 1991. In the aftermath of the Savannah River site shutdown, the United States has met its tritium requirements

Deleted

Full funding of DOE's budget is also needed to restore these facilities to operation, and to keep all other elements of the complex in operation.

(U) New tritium production will be needed as long as we have nuclear weapons. The New Production Reactor program is necessary to insure that we will have an assured, reliable supply for our deterrent in the next century.

(U) In the remainder of my testimony I will address the work of the Nuclear Weapons Council during the last year, amplify on the remarks I have just made, and comment on related activities in support of deployed weapons.

NUCLEAR WEAPONS COUNCIL (U)

(U) The Nuclear Weapons Council (NWC) was established by the 1987 National Defense Authorization Act.

(U) A primary responsibility of the NWC is the annual preparation of the Nuclear Weapons Stockpile Memorandum (NWSM). To accomplish this, the Council reviews the warhead requirements, the inventory of essential nuclear material, and the capability of DOE's infrastructure. I can assure you that those requirements are reviewed very thoroughly at all levels within the DoD and DOE and represent our best judgment that the stockpile is properly sized for the military objectives required to fulfill our national policy of deterrence. When determining our blueprint for building and retiring warheads, the DOE's capabilities are weighed carefully.

Our philosophical objective is to maintain a minimum stockpile consistent with military requirements. This goal cannot be achieved without a modern nuclear weapons complex that is environmentally safe and in compliance with today's standards. The Council and the

Department of Defense strongly support the DOE efforts that permit restart of the Savannah River reactors. Restart must be accomplished

Deleted

In addition, resumption of operations at Rocky Flats is critical to meet established stockpile requirements.

Disruptions in the day-to-day operations of each facility in the production complex cascade downward to affect other elements. Of particular concern, is the interruption of plutonium operations at Rocky Flats. If sustained, it will result in delays to the essential modernization of the stockpile.

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(U) Another important area of the Council's responsibility is the consideration of nuclear weapons systems safety. During the year past, we have established a supporting committee for weapons safety to augment the safety responsibilities of the previously established Standing Committee.

(U) Both the Nuclear Weapons Council Standing Committee (NWCSC), and the Weapons Safety Committee (WSC) support the NWC. These committees include appropriate representation from both DoD and DOE including the Military Services, the Joint Staff, and the various elements of the Department of

Energy. Official observers from the Defense Nuclear Agency and key offices with nuclear responsibilities within the Office of the Secretary of Defense are invited to participate in all meetings, deliberations, and activities. These groups meet monthly to review continuing actions begun under the guidance and direction of the NWC. Annually, the Standing Committee, along with invited congressional committee staff members, visits DOE and DoD facilities to become better acquainted with DOE functional responsibilities, management methods, technology base, and industrial support, as well as DoD operations. The Standing Committee's regular meetings and visits have resulted in improved cooperation and information exchanges. Site visits throughout the complex have focused the Committee's attention on (a) the need for modernization of the complex for reasons of improved safety as well as environmental compliance; (b) reducing transuranic and other hazardous wastes through improved processing; (c) increasing efficiency and production through Total Quality Management practices; and, (d) improving quality and design of production interfaces through computer aided design and manufacturing.

NUCLEAR WEAPONS COMPLEX (U)

(U) The DoD shares with the Secretary of Energy the view that rehabilitating the nuclear weapons complex deserves immediate attention.

(U) The DOE nuclear weapons complex represents a dedicated research and manufacturing infrastructure which supports our nuclear weapons stockpile. Unfortunately, many of the facilities comprising this complex were constructed more than 30 years ago, designed and built to standards and regulations very different and less stringent than those of today. Consequently, across the board production problems due to obsolete technology and more demanding environmental, safety, and health standards and requirements are looming. Despite upgrades and renovations to ensure safer operation, the natural decay of aging has taken its toll. Outages, and shutdowns such as those recently experienced at Savannah River and Rocky Flats, can only increase in frequency in the future unless modernization efforts are properly funded and implemented. The fragility of the aging DOE Nuclear Weapons Complex is threatening our ability to meet defense mission requirements.

(U) Regardless of the course of future world political events, the weapons complex is vital to our Country. In the future the complex must be ready to rebuild weapons to incorporate modern safety and security features or dismantle retired weapons to recover valuable nuclear materials.

The requirement for an assured supply of tritium to replace that which has decayed in the stockpile continues to focus our attention on the aging Savannah River reactors.

Since Spring 1988, when these reactors were shut down,

Deleted and economies in the DOE tritium pipeline have been used to provide the tritium required to make weapons work.

Deleted

(U) Given the unknown longevity of the current reactors, national security considerations dictate the immediate implementation of the DOE's three-part strategy identified in the President's budget. Besides the design and construction of two modern production reactors, this strategy also calls for development of light-water reactor targets as a contingency measure for the mid-term. The political and institutional issues associated with the use of light-water reactors for tritium production are formidable. However, these issues must be confronted and weighed against the magnitude of the national security catastrophy that would arise if the Savannah River Site should fail at any time to produce the requisite quantities of tritium before new production reactors are a reality.

(U) Finally, we must not lose sight of the fundamental importance of maintaining a state-of-the-art Department of Energy research, development, and testing capability. As long as the United States relies on nuclear weapons to guarantee its security, a nuclear weapons technology base will be essential to keeping the deterrent credible. Without this base, we can expect neither to respond effectively to the changing global environment, nor to avoid technological surprise.

NUCLEAR WEAPONS STOCKPILE STATUS (U)

(U) In view of the important role played by this Committee in maintaining a safe, secure, reliable, and effective nuclear deterrent, I have made a commitment to inform you once a year on the state of the nuclear stockpile. I have assembled some statistics which will update those furnished to you in my testimony last year.

On December 31, 1989, the U.S. nuclear warhead inventory consisted of *Deleted* warheads, a *Deleted* warheads from the previous year end total.

Deleted

There are 25 different warhead types in today's inventory; *Deleted*

STOCKPILE MODERNIZATION (U)

In this same timeframe

Deleted

The President's budget for DOE defense program actions balances the need for the renovation of the fragile and aging nuclear production complex with environmental restoration with the competing goal of maintaining a safe, reliable, and effective stockpile.

As I noted earlier, the disruptions in DOE's production facilities have delayed important modernization objectives.

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This rate of build will not allow us to meet our objectives for the continued improvements needed for strategic modernization and the incorporation of modern safety, security and use control features into the stockpile. The restoration of a healthy DOE production complex will allow the nation to produce at the necessary rate.

(U) The stockpile requirements for the future are under continuous reevaluation. This year, in conjunction with the development of a DoD five-year plan for FY 1992-96, we will once again validate the requirements and evaluate the nuclear weapon requirements of a future world.

STRATEGIC NUCLEAR FORCE MODERNIZATION (U)

(U) The stockpile plan supports the following strategic programs:

- TRIDENT II (D-5 W88. DOE is producing the W88 warhead for deployment of the TRIDENT II (D-5) missile beginning late FY 1990. With the combination of high accuracy and yield, the D-5 will provide our survivable, sea-based strategic force with a greatly improved hard target kill capability. The ninth TRIDENT submarine based at Kings Bay, Georgia, will carry the D-5 missile with W88 warheads. Subsequent new construction TRIDENT SSBNs will be D-5 equipped and be based both in Kings Bay and Bangor, Washington. The orginal eight TRIDENTs will be backfitted with the D-5 systems during regularly scheduled overhauls.

- SRAM II/W89. The SRAM II warhead has entered engineering development and will fully support the SRAM II missile delivery schedule.

Deleted

The fielding of this system will permit removal of the aging SRAM A warhead. This deployment is crucial to our strategic modernization program.

Deleted

NONSTRATEGIC NUCLEAR FORCE MODERNIZATION (U)

(U) Since 1961 the defense strategy of this country has included flexible response. President Bush and Secretary Cheney have recently reiterated their commitment to this policy. Flexible response, as a strategy, requires the United States to maintain a weapons stockpile with a variety of yields and delivery systems so that nuclear deterrence exists at any level of conflict.

LAND-BASED NONSTRATEGIC NUCLEAR FORCES (U)

(U) Two critical requirements are a nuclear tactical air-to-surface missile (TASM) to replace a portion of the nuclear bombs now designed to be carried on U.S. and allied aircraft, and a longer-range, more survivable replacement for the aging nuclear-capable Lance surface-to-surface missile. These systems, coupled with continued modernization of nuclear artillery are a national and identified NATO requirement.

(U) The current DOE budget supports Phase 3 development engineering tasks for a TASM warhead and Phase 2a design and cost studies for a Follow-On To Lance (FOTL) warhead. The DOE FY 1991 budget supports the full-scale development efforts for a common warhead design for the TASM and FOTL.

The Nuclear Weapons Council encouraged the common warhead approach for these systems.

Tactical Air-to-Surface Missile (TASM). SACEUR continues to reaffirm the requirement for a TASM

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A modern warhead for this missile will meet modern safety and security requirements.

Follow-On to LANCE (FOTL).

Deleted

AIR FORCE TACTICAL BOMB MODERNIZATION (U)

(U) DOE is currently producing B61-3, B61-4 and B61-10 bombs, all of which incorporate the most modern safety, security, and use control features.

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ARTILLERY FIRED ATOMIC PROJECTILE (AFAP) (U)

New AFAPs offer improvements in response time, targeting effectiveness, modern safety features, command and control, and security over their 1956 and 1963 vintage predecessors. The W82 is in DOE Phase 3, engineering development. The W79 8-inch AFAP was first produced in 1981.

Deleted

NAVY ANTISUBMARINE AND LAND ATTACK NUCLEAR WEAPONS (U)

(U) The United States deploys nuclear warheads on a wide variety of ships. Nuclear-capable carrier-based aircraft and nuclear Tomahawk sea-launched cruise missiles have three vital roles: contributing to our nuclear reserve force; providing a worldwide deterrent; and deterring attacks on our naval forces by Soviet nuclear antiship missiles (especially those aboard Backfire and Badger aircraft).

The B90 nuclear depth/strike bomb, currently in Phase 3 engineering development, will replace the 28 year old B57 nuclear depth/strike bomb. *Deleted* *Deleted* Conventional systems backed up by the ND/SB will provide Navy's antisubmarine capability.

TLAM/N (W80-0). The Tomahawk Nuclear Land Attack Cruise Missile, or TLAM/N, greatly enhances the Navy's contribution to the U.S. deterrent posture by distributing Navy retaliatory striking power across a large number of naval platforms. DOE is continuing to produce W80-0 warheads for TLAM/N deployments

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SAFETY, SECURITY AND SURVIVABILITY (U)

(U) As I have previously indicated, the Council and the two Departments consider incorporation of modern safety and security to the stockpile with equivalent concern as improved effectiveness. In fact, we recognize that the incorporation of optimal safety, security and use control features permits improved weapon system effectiveness through enhanced operational flexibility.

Since 1980, modern nuclear weapon safety features have been incorporated in approximately *Deleted* of the stockpile. Enhanced security features are included on approximately *Deleted* Such features include Insensitive High Explosive (IHE), nonviolent disablement, safe and predictable accident response, and modern use control.

IHE is the most important safety feature of our modernization effort. Its intention is to reduce the risk of scattering plutonium in case of an accident that detonates normal high explosives. Today, about *Deleted* of the stockpile weapons use IHE. Because of the penalty in weight and size associated with using IHE (it is less energetic than other high explosive materials, therefore, more is needed), not all warheads can be made with IHE. We are working, however, to include IHE in all appropriate warheads in the stockpile and expect to have *Deleted* of the stockpile outfitted with IHE by the year 2000.

All nuclear weapons are protected by physical security and launch protection features. Use control devices prevent the use of that warhead by anyone who would breach the military security system and gain access to the weapon while simultaneously permitting its use when directed by national security. There are several categories of warhead use control: combination locks on older weapons; Category D and F Permissive Action Link (PAL) devices on our newest weapons, as well as some older versions known as Category A and B PALs; and established procedures.

DOE currently designs warhead electronics such that we can be confident that the probability of a detonation in any plausable accident is less than one chance in a million. Currently, these enhanced safety features have been incorporated in *Deleted* the weapons in the stockpile as a result of modern warhead production and the modification of existing warheads. Over *Deleted* of the stockpile will have such features by the year 2000.

STOCKPILE IMPROVEMENT PROGRAM (U)

(U) The joint DoD/DOE Stockpile Improvement Program (SIP) was initiated formally by the Military Liaison

Committee in 1979. Yearly, each weapon is examined to review its operating environment, service recommendations, results of studies, present SIP efforts, and/or planned retirement/replacement programs.

The 1988 review found that the highest level of safety concern for deployed "older weapons" has been addressed

Deleted

All of these incorporate modern nuclear design safety features. Additionally, the 1989 SIP review endorsed the NDSB/B90, which will replace the *Deleted*

NUCLEAR WEAPONS SECURITY (U)

(U) The DoD and the DOE, in close cooperation, carry on a continuous program to upgrade our nuclear weapons security capability.

(U) One of the great challenges of the 1980s has been the ever-changing threat from both terrorists and state sponsored operatives. These groups have demonstrated increasing sophistication in tactics and technology; e.g., the downing of Pan Am Flight 703. A dynamic, evolving security system must always anticipate hostile capabilities and intentions. The terrorist situation presents a special challenge to nuclear weapons security personnel.

(U) Today the physical security of nuclear weapons deployed by the DoD will meet the peacetime threat as we know it. However, the threat continues to evolve and increase. To counter the threat, eliminate the vulnerabilities, and maintain the security of the stockpile, security policy and systems must be developed and fielded quickly and efficiently.

Following are examples of currently active equipment programs conducted in collaboration with DOE and whose goals are to improve our ability to protect nuclear weapons against the continually evolving threat:

Weapons Access Delay System (WADS). WADS is a Sandia-inspired system

Deleted

which significantly delays unauthorized access to nuclear weapons in storage.

Deleted

(U) Maintenance and Assembly Security Storage (MASS) and Warhead Protective Casing (WPC). These programs are investigating means to mitigate recognized vulnerabilities associated with nuclear weapons while in storage, during transport and while located in an overseas maintenance and assembly facility.

(U) Mobile Intrusion Detection and Assessment System (MIDAS) is being developed to provide security alarms for the Small ICBM should it be dispersed in the Southwest basing mode.

(U) Tactical Intrusion Detection System (TIDS) is being designed to protect systems deployed in the field against stealthy intruders.

(U) Weapons Storage and Security System (WS3). To improve the security and survivability of air-delivered bombs in an increasingly hostile environment, the Weapons Storage and Security System (WS3), was developed for DoD by DOE. WS3 provides for the safe and secure collocation of aircraft and weapons in hardened aircraft shelters.

(U) I have provided an extensive description of our nuclear weapons-related physical security activities because DoD depends very heavily upon the DOE's ability to provide extensive technical assistance to the DoD in these areas. I believe we have an active program which is producing sound technical options to meet the evolving threat. This work however, is never complete and needs to receive our continued and collective emphasis and support to see that needed improvements are fielded in a timely manner.

ACCIDENT RESPONSE (U)

(U) The Department of Defense (DOD), in conjunction with the Department of Energy (DOE), maintains a worldwide capability to respond to an accident involving a nuclear weapon. Continuous operation of the National Military Command Center provides the capability for prompt notification of appropriate response organizations and for initial control of response actions. Additionally, the Defense Nuclear Agency maintains a continuously manned Joint Nuclear Accident Coordinating Center, closely tied to a similar DOE center, staffed to assist in coordinating responses for rapid reaction to an accident situation. Throughout the year, all response teams undergo training, and field and command post exercises are held to practice and evaluate the coordinated Federal responses to nuclear weapons accidents.

UNDERGROUND TESTING (U)

(U) For over 40 years, our credible nuclear deterrent forces—requiring a robust arsenal of reliable, safe, survivable, and effective nuclear weapons—have maintained the peace. The DOE nuclear testing program supported by the FY 1991 budget is indispensable to this credible deterrent in several important ways.

(U) First, nuclear testing is vital for establishing and maintaining confidence in the operability and reliability of nuclear weapons. Second, we conduct a nuclear test program to improve the safety, security and effectiveness of our nuclear arsenal. This testing allows us to ensure that the highest possible standards for our warheads are satisfied. Third, the United States tests to ensure we understand the effects of a nuclear environment on military systems. This allows us to have confidence in the survivability of our weapons and our supporting C^3I systems. Finally, by continuing to advance our understanding of nuclear weapons design, nuclear testing serves to avoid technological surprise and to allow us to respond to the evolving threat.

(U) The DoD, based upon the testimony of the national laboratory directors, recognizes our current dependence on continued nuclear testing at the current 150 kt threshold limit. Further nuclear testing limits, including reduction in the number of tests, in the absence of significant changes in our nuclear deterrent requirements, will weaken the ultimate goal of our nuclear arms.

SUMMARY (U)

(U) To review my major points, let me summarize:

(U) Deterrence is, and will remain critical to United States national security. To maintain deterrence, DoD depends upon a strong DOE Defense program activity.

(U) Continued modernization of both our strategic and nonstrategic nuclear forces is essential.

(U) A safe, secure, and effective nuclear deterrent requires a modernized DOE Nuclear Weapons Complex capable of operating safely and with a minimum environmental disturbance.

(U) The Weapons Complex must be again functioning at full capacity in the near future or our defense programs will be compromised.

Military Applications

STATEMENT OF ADM. J. MICHAEL BARR, USN, DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATION, DEPARTMENT OF ENERGY

Dr. Knuth. Our next witness is Rear Adm. Michael Barr, Deputy Assistant Secretary for Military Application within the Department of Energy.

Admiral Barr.

Admiral Barr. Mr. Chairman and members of the committee, it is a pleasure to appear before you today in support of the DOE's fiscal year 1991 budget.

With your permission, I would like to submit my full statement for the record and give you a summary statement.

Senator Johnston. Without objection.

Admiral Barr. This is the first time I have appeared before your committee. I assumed my current position last July.

This afternoon, I would briefly like to highlight our budget request and also discuss several areas of concern.

BUDGET REQUEST FOR WEAPONS ACTIVITIES

Admiral Barr. As shown on the chart, the fiscal year 1991 budget request is over $4.6 billion, representing a 9.5-percent increase over 1990.

FY 1991 CONGRESSIONAL BUDGET REQUEST SUMMARY
($ IN MILLIONS)

Research, Development, & Testing	FY 1989	FY 1990	FY 1991 Request
Core	$1,435.6	$1,480.2	$1,525.9
NDEW	240.3	214.4	191.9
Inertial Fusion	163.5	169.2	166.8
	$1,839.4	$1,863.8	$1,884.6
Production & Surveillance	2,103.9	2,374.5	2,757.0
Total Weapons Activities	$3,943.3	$4,238.3	$4,641.6
		+7.4%	+9.5%

The budget is a product of shifting priorities. We are emphasizing formality and discipline of operations, continuing to upgrade our performance in environment, safety, and health matters; and improving our commitments to modernization and maintenance of the complex.

To do this within current fiscal limitations is going to mean less production, less testing, and less research and development. We have formulated our programs for fiscal year 1991 to try to provide a balance among many competing demands.

[Chart deleted.]

PRODUCTION AND SURVEILLANCE

Admiral Barr. Turning to production and surveillance, last year we again fulfilled our obligation for weapons deliveries; [deleted] were produced and delivered to the DOD, including the first deliveries of the W88 warhead for the Trident II ballistic missile. This chart displays weapons deliveries, new builds, and stockpile improvements, as well as retirements, and the equivalent workload trend.

WEAPONS WORKLOAD

For fiscal year 1991, the total stockpile is planned to be [deleted]. But it is decreased by about 10 percent since 1985. The Departments of Defense and Energy are working to establish production requirements that are balanced and realistic in terms of current needs and take into consideration competing demands for future DOE funding. [Deleted.]

Several changes have occurred since last year. [Deleted.]

This is due to a combination of program slips and funding constraints. A further reduction of deliveries is expected in 1990 because of the current Rocky Flats outage. We are working with DOD to minimize these impacts.

The budget request supports production activities [deleted] weapons in 1991 and preproduction activities for eight systems. The budget request for production and surveillance activities increases 16 percent from 1990 to 1991, mainly due to growth in environment, safety and health, maintenance, and initiatives for training and transportation in the production and support area. I should point out that funding directly related to production of weapons increases less than 2 percent.

PRODUCTION AND SURVEILLANCE TOTAL FUNDING ($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 Request
Operating Expenses	$1,793.8	$1,968.2	$2,299.9
Capital Equipment	103.8	113.4	128.6
Construction	206.4	292.9	328.5
Total P&S	$2,103.9	$2,374.5	$2,757.0

PRODUCTION AND SURVEILLANCE BUDGET

We are proposing four initiatives within the P&S budget for fiscal year 1991. The largest is $155 million for upgrades to the Rocky Flats plant, and I will talk more about that in a few minutes.

Closely related to this request is an additional $23 million for training, consistent with the requirements of the new DOE order on performance based training for personnel operating nonreactor nuclear facilities. These funds will be targeted primarily at Rocky Flats in 1991.

TRANSPORTATION

Another initiative supports our commitment to enhance nuclear weapon safety. The request contains $19.7 million to continue to expand DOE's safe, secure transportation network, with 12 additional trailers and associated equipment and carriers. These are required because currently, some weapons in DOE custody which contain conventional high explosives, are shipped by air. This initiative will permit ground shipment within the contiguous United States of all of these weapons by 1993. This change will reduce the risk of plutonium dispersal in the event of transportation accident.

Finally, we have requested $23 million to partially fund a contract closeout liability with the Monsanto Corp. This will fund health benefits for retirees for the Mound, OH, plant.

RESEARCH, DEVELOPMENT AND TESTING TOTAL FUNDING ($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 Request
Core Program	$1,435.6	$1,480.2	$1,525.9
Nuclear Directed Energy Weapons	240.3	214.4	191.9
Inertial Fusion	163.5	169.2	166.8
Total RD&T	$1,839.4	$1,863.8	$1,884.6

RESEARCH, DEVELOPMENT, AND TESTING BUDGET

Turning to the RD&T budget, the request is about $1.9 millon, an increase of only 1 percent from the 1990 level. The breakdown between the core program, nuclear-directed energy research, and inertial fusion is as shown on the chart.

NUCLEAR-DIRECTED ENERGY WEAPONS

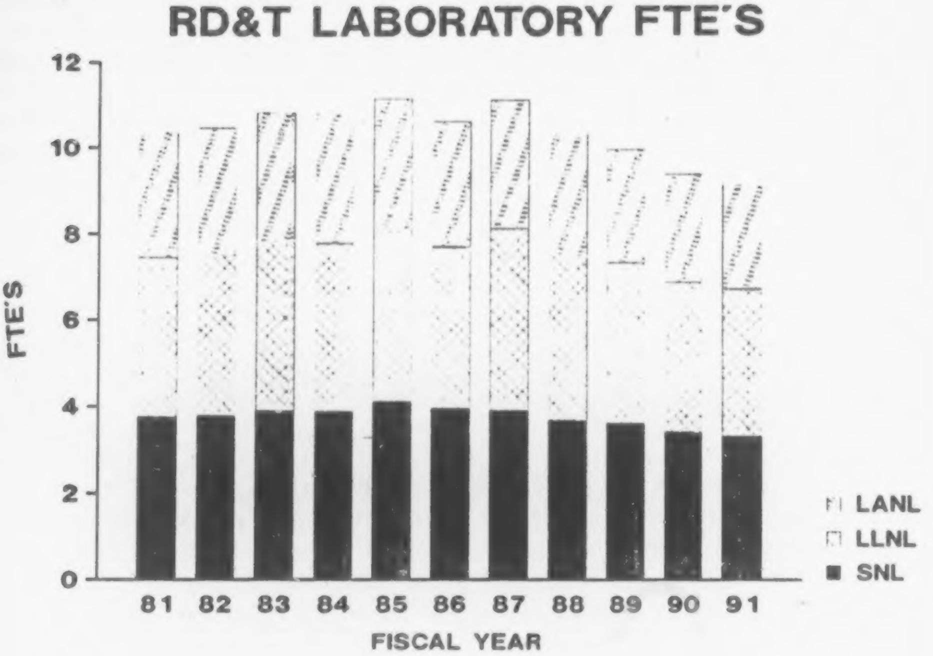
We conduct nuclear-directed energy research to assess the threat to future defensive systems and to assess the vulnerability of our current strategic deterrent. The program integrates theory and equipment. The fiscal year 1991 budget request of $191.9 million places the program at about 10 percent below the fiscal year 1990 levels.

However, research on nuclear-directed energy weapons continues to be vital in carrying out our mission responsibilities for threat assessment.

INERTIAL FUSION

Inertial fusion activities contribute to increased understanding of the phenomenon that may occur during a thermonuclear explosion. In the long term, it may provide a means for simulating some aspects of a thermonuclear explosion in the laboratory and provide the capability to perform warhead survivability experiments.

The fiscal year 1991 request for inertial fusion is $166.8 million, slightly below the 1990 level of effort, reflecting overall laboratory priorities.



LABORATORY FTE'S

An issue of concern is the decline in laboratory employment supported by the weapons RD&T program. This employment is projected to decline about 2 percent to 3 percent from 1990 to 1991, a reduction of about 250 full-time equivalents.

Loss of these skilled people affects the nuclear competence of the weapons program. Such skills are not available in the private sector. When they are lost, they take many years to be replaced.

The downward trend of FTE's is primarily caused by changes in weapons program priorities resulting from increased emphases in such areas as safeguards and environment, safety, and health. Once again, this situation reflects the realities of balancing competing demands within budget constraints.

[Chart deleted.]

TESTING

[Deleted] are planned for 1991. We view this level with concern. It is only about one-half the number of underground tests per year that the laboratories believe are needed to perform their mission responsibilities.

It is important to recognize that in a testing program this small, we have little or no flexibility to respond to technical problems or major design changes. [Deleted.]

The Department's first annual report to the Congress on the program for preparation for further limitations on nuclear testing has been completed. The report reflects the fact that the majority of program elements requested by the legislation have been in place and operating for many years. For example, the weapons program already includes a vigorous stockpile inspection and nonexplosive testing program. Other activities, particularly those to improve predictive capability, have been given additional emphasis.

Since last year's testimony, the first phase of the above-ground experimental capability study has been completed and we are nearing the completion of the remanufacturing substitution study, described to your staff in January 1989.

While we believe there will be some progress in the test limitation readiness program, it is our view that there will be limits on what can be accomplished. Nuclear testing will be required as long as we rely on a nuclear deterrent.

ROCKY FLATS PLUTONIUM RECOVERY FACILITY

Turning briefly to our construction program, the most important ongoing construction project in the weapons complex is the modification of building 371 at Rocky Flats. This project is needed to replace outdated and unreliable facilities. Buildings 771 and 776 cannot be upgraded to meet today's environmental and safety criteria. Regardless of whether the DOE ultimately relocates plutonium processing from Rocky Flats, this project will be needed for more than 20 years to provide reliable processing capability using updated chemistry, to reduce waste generation, and to help eliminate backlog of residues now stored in drums.

We believe that there are no reasonable alternatives to completing this project. Building a new facility at another site is estimated to take 8 to 10 years and cost over $1 billion. Other DOE plutonium processing sites, such as Los Alamos and Savannah River, have limited capacities for throughput, about one-half the annual requirement, and limited capabilities to process certain feed materials and site returns.

Another consideration is the increased risk and cost of additional cross-country shipments of plutonium and plutonium residues. Processing residues at the point of origin, in building 371, is the most sound, safe, and secure approach.

The project is undergoing review to establish a detailed technical baseline. The current TEC has increased to between $500 million and $600 million, up from about $371 million established in 1987. About $50 million of this increase is attributable to delays in construction initiation; about $30 million for process changes; while the remainder is required to meet new safety standards, including redundant ventilation systems, electrical systems, and instrumentation and control.

The fiscal year 1991 request is for $65 million to continue preliminary design and initiate long-lead procurements upon completion of the environmental impact statement process. The EIS process is about to start and, with a positive record of decision, construction will start in 1991.

Project completion is scheduled for 1997. We are striving to meet the urgent need within DOE for modern, reliable plutonium processing and capability.

ROCKY FLATS PLUTONIUM OPERATIONS

The resumption of operations at the Rocky Flats plant is the highest weapons program priority. Plutonium operations were suspended for the semiannual special nuclear materials inventory in early December. EG&G took over responsibility for plant operations on January 1, 1990.

We extended the suspension of operations to permit EG&G to install their own management routine, to gain a comprehensive understanding of plant operations, to implement operational changes in terms of formality and discipline, and to make changes which will increase the margin of safety.

The schedule for phased resumption of plutonium operations is not firm at this point. We anticipate resumption of operations in the second quarter of this year, with full production in the third quarter.

TRANSURANIC WASTE DISPOSAL

A troublesome aspect of the situation at the site concerns storage and the disposition of transuranic waste, mixed with hazardous components, TRU mixed waste. Our permit, granted by the State of Colorado, allows us to store not more than 1,601 cubic yards of this type of waste on the site. Even during standby, waste is being generated and must be stored. The on-site storage limit is projected to be reached about November of this year.

Since no permanent storage facility will be available until the waste isolation pilot plant comes on line, a supercompactor has been procured to reduce the volume of waste to be stored and, thereby, provide temporary relief. I expect the supercompactor to be operational before the storage limit operational is reached. Supercompacting of the waste will provide an additional 1 to 2 years before the 1,601-cubic-yard limit is again approached.

RECENT JUDICIAL RULING

I should also add here that a recent decision by a judge in Colorado has potentially turned some of our residues into waste and we are evaluating the effect that that is going to have on us.

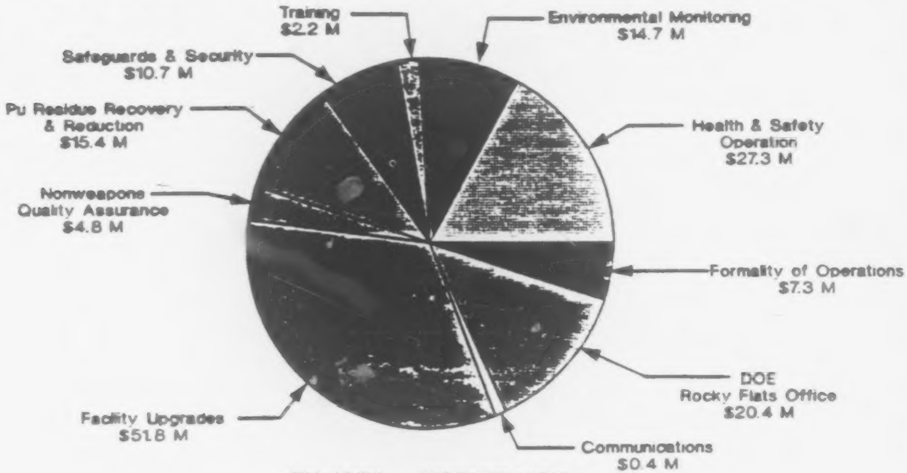
Senator JOHNSTON. The judge's decision would include those chemical waste, in effect toxic wastes, and your 1,601-cubic-yard limit, then?

Admiral BARR. No, sir; that's not certain. That's one of the issues we have to determine.

The ruling changes or takes some of the residuals, particularly associated with the incinerator in Building 771—either ash which has been through it, or feed, which has not yet been through it before we shut down—and has indicated that those need to be treated as RCRA hazardous waste.

It is not clear at this point whether the Governor will insist that those be included in the 1,601 limit or not. That is one of the things that we have to determine.

ROCKY FLATS OPERATIONAL IMPROVEMENTS



FY 1991 - $155 MILLION

ROCKY FLATS INITIATIVE

The additional funding requested for the Rocky Flats initiative will support a wide range of activities needed for facility safety and operational upgrade. The largest component, $51.8 million, is for facility upgrades at the site. These include utilities, upgraded sewer treatment, enhanced spill prevention for hazardous liquids, and administrative and support facilities to house the augmented work force.

Another $15 million is requested for plutonium residue reduction and recovery, including a drum storage facility. About $27 million is requested for health and safety of operations. This will provide programs and equipment to enhance our dosimetry, decontamination, health physics support, industrial hygiene, radiation safety, and a facility to house environment, safety, and health laboratories.

The remainder of the initiative is made up of actions to respond to review and audit team findings. We are doing everything from replacing filters and valves to assuring that documentation is properly prepared.

All of this is to insure that we operate safety and effectively within the letter and spirit of applicable laws, regulations, and agreements.

In closing, I want to assure you that we are committed to maintaining the nuclear deterrent, a keystone for our national security. We are committed to safe and secure operations, safe for our employees and for the public.

Finally, we are committed to maintaining a viable nuclear weapons complex to assure that we meet our Nation's needs today and modernize to meet tomorrow's needs as well.

Thank you.

[The statement follows:]

STATEMENT OF REAR ADM. J.M. BARR, USN

Mr. Chairman, members of the panel, it is a pleasure to appear before you to testify in support of the Department of Energy's (DOE) Atomic Energy Defense Activities budget request for fiscal year 1991.

1. INTRODUCTION

MISSION OF THE NUCLEAR WEAPONS PROGRAM

The mission of the DOE nuclear weapons program is to support United States national security policy. The keystone of this policy is the nuclear deterrent. In order to assure safe and credible options for nuclear deterrence, we conduct research, development and testing for military applications, and produce, maintain and retire nuclear weapons to support the Nation's stockpile. And finally, we are charged with the responsibility to maintain the United States' nuclear weapons complex operating in a safe, environmentally acceptable manner.

There are three important adjuncts to our mission statement for the 1990's. Secretary Watkins has made these principles the watchwords for his Administration. These are that there must be compatibility between our mission to develop and produce nuclear weapons and protection of the environment; that there be a dedication to excellence in all of our endeavors; and, that we must welcome constructive criticism about all levels of our operations. These principles serve as goals to be attained and benchmarks to measure our progress toward effecting positive cultural change throughout our program operations. I also believe that these principles are the best way to allow DOE to continue to support our nuclear deterrent.

This statement presents four subject areas: resources to accomplish the program goals; major concerns; a report on program accomplishments; and the FY 1991 budget request.

RESOURCES

The nuclear weapons complex represents a unique national investment which has evolved over the past 40 years.

Nuclear weapons program activities are the largest single component of the Department of Energy's budget. This essential national security program represents less than three percent of the Nation's overall spending for defense.

The nuclear weapons complex of today is a balanced combination of highly experienced and qualified scientists, engineers and technicians, coupled with specialized equipment and facilities. This is the DOE technology base which allows us to maintain a research, development and testing capability that is second to none, and to provide state-of-the-art manufacturing capability that meets stringent environmental, safety, health, (ES&H) and security standards.

RESEARCH, DEVELOPMENT AND TESTING

The Weapons Research, Development and Testing program plays an essential role in maintaining the credibility of the U.S. nuclear deterrent. Particularly in this time of rapid change, it is very likely that the RD&T program will be even more important.

Day-to-day technical management of the research, development and testing activities is carried out through the Los Alamos and Lawrence Livermore National Laboratories, which are the nuclear design laboratories; the Sandia National Laboratory, which is the weapons engineering development laboratory, and the Nevada Test Site, where underground nuclear testing is conducted.

Along with unique "birth to death" responsibilities for the weapons in the stockpile, the research, development and testing technology base is vital as the stockpile continues to evolve in response to external forces. As arms control negotiations continue with the possibility of reducing the numbers of nuclear and conventional weapons, it is likely that the force structure will be reconfigured in fundamental ways. Reduced numbers and emerging non-nuclear technologies will place an ever greater premium on survivability of our forces, and it is imperative that we have the highest confidence in those remaining. New system designs will be needed to add flexibility and robust operation to the remaining forces.

The Research, Development, and Testing complex threat assessment capability is an area of increasing importance. It is vital that we not be surprised -- technically -- and that we remain prepared to respond to new threats. We must maintain a vigorous RD&T technology base to assure the nation that we understand fully what is technically possible, and how it could be exploited either by us or against us. Firsthand knowledge is a principal factor in ensuring that no potential adversary could gain an advantage which would reduce the effectiveness of the Nation's nuclear deterrent.

WEAPONS PRODUCTION BASE

The weapons production base is another indispensable resource for the weapons program that must be maintained to fulfill our mission requirements. The Nation's nuclear weapons production complex is comprised of seven government owned, contractor operated production facilities. As with the RD&T technology base, many of the capabilities in these plants cannot be provided anywhere in the private sector. The plants and laboratories are integrated into a nationwide production line, linked together by a computer network that transmits design and engineering information for manufacturing components and piece parts, and a safe, secure transportation system to move components and finished products between sites.

FACILITIES MODERNIZATION

The nuclear weapons complex is a national resource which is troubled by the aging of key facilities. This is one of the root causes of today's problems throughout the complex. As a result, Secretary Watkins has elevated attention to facilities assumptions and conclusions of the modernization study which was performed two years ago.

Representatives from the weapons RD&T and production programs are participating fully in this revalidation of the study. The results are to be reported to Secretary Watkins in August of this year, and will be used in formulating the FY 1992 budget. The modified report, consistent with the budget, should be available in January, 1991. The report will provide a coherent modernization strategy, a workable, fundable program to prevent further deterioration of the complex, and a plan for modernizing the weapons complex to support our nuclear deterrent well into the 21st century.

2. CONCERNS

ROCKY FLATS PLANT

Resumption of operations at the Rocky Flats Plant is the highest weapons program priority. Plutonium operations were suspended for the semi-annual nuclear materials inventory in early December. EG&G took over the responsibility for plant operation on January 1, 1990.

We have extended the suspension of operations to permit EG&G to install their own management team and to gain a comprehensive understanding of plant operations, to implement some operational changes in terms of formality and discipline, and to increase the margin of safety in plutonium operations. The schedule for a phased resumption of full operations is expected to be finalized in April, 1990. Currently, we are planning to resume partial operations during the second quarter of CY 1990, with full operations following in the third quarter. Unfortunately, this will not allow us to achieve all of our production goals for FY 1990.

(CHART 1) Another troublesome aspect of the situation at the site concerns storage and disposition of transuranic waste mixed with hazardous components -- TRU mixed waste. Our permit, granted by the State of Colorado, allows us to store not more than 1,601 cubic yards of this type of waste. Even during standby, waste is being generated, and is being stored on site. The on-site storage limit is projected to be reached about August, 1990. Since no permanent storage facility will be available until the Waste Isolation Pilot Plant comes on line, a supercompactor has been procured to reduce the volume of waste to be stored - and thereby provide temporary relief. I expect the supercompactor to be operational before the storage limit is reached. Supercompacting the waste will provide an additional one to two years before the 1,601 cubic yard limit is again approached.

3. ACCOMPLISHMENTS

WEAPONS SAFETY

During FY 1989, we had several accomplishments in the area of nuclear weapon safety. Last fall, the Departments of Energy and Defense chartered a joint Weapons Safety Committee, under the Nuclear Weapons Council, to serve as a dedicated body for considering nuclear weapons safety issues. The establishment of the committee provides a means for rapid access to both secretaries, when necessary, to inform them of significant safety issues. As the Chairman of this committee, I believe this will enable both Departments to better execute their shared responsibility for nuclear weapon safety.

Other accomplishments include development of a DOE use control policy; initiation of a joint DOE/DOD weapons transportation study; and the start of a study to determine the feasibility of a risk assessment-based weapons safety evaluation process.

WEAPONS PRODUCTION AND SURVEILLANCE

(CHART 2) In fiscal year 1989, the Department of Energy weapons production complex completed all required production milestones. *Deleted* new or modified warheads were produced and delivered to the Department of Defense for deployment. We continued production on the B61 tactical bomb system, the B83 strategic bomb, the W80-1 Sea and W80-0 Air-Launched Cruise Missile warheads. We initiated production of the W88 Trident II Submarine-Launched Ballistic Missile (SLBM) program.

Three weapons continued in production engineering during fiscal year 1989: the W82 155mm Artillery Fired Atomic Projectile, the B90 Nuclear Depth/Strike Bomb (ND/SB), and the W89 Short-Range Attack Missile (SRAM) II warhead.

The W89/SRAM II and the B90/ND/SB bomb programs will provide significant safety and operational effectiveness enhancements to the Air Force and the Navy, and they will be a significant part of our national security deterrent well into the next century.

In addition to production of new weapons, our continued investment in stockpile reliability and safety is absolutely essential to our mission. During FY 1989, we completed

Deleted

During FY 1989, we retired Deleted warheads from the nuclear weapons stockpile. Other stockpile units required exchange of limited life components. The stockpile evaluation activity includes product acceptance, new material and stockpile laboratory test, and new material and stockpile flight test and surveillance with the B83, W87, W88 and other warheads.

Significant accomplishments in quality and efficiency have been achieved throughout the production complex. Process development activities contribute to all aspects of production operations. As a result of statistical analysis at the Rocky Flats Plant, the B61 Bomb plutonium components rejection rates dropped Deleted and resulted in savings of about $180,000 annually.

At the Savannah River Site, development of a new hydride process to separate hydrogen isotopes from impurities is underway with a estimated yearly savings of $450,000. Superplasticly formed uranium-niobium alloy blanks have been produced for the W89 at the Y-12 Plant which reduces production time from 2 hours to 30 minutes. This should save about $200,000 over the life of the program.

Quality initiatives have also contributed to the overall improvement of operations within the production plants. The Mound Plant developed an improved timer disassembly process and removal fixture that permitted reuse of the timer at a fraction of the cost of new built units. A cost savings of $940,000 resulted. This plant also replaced an obsolescent, difficult to repair Atomic Absorption Spectrometer with an Inductively Coupled plasma instrument. The new instrument eliminates the need for extensive decontamination of samples and also minimizes the risk of contaminating a "cold" sample. Over the life of the equipment $1.9 million is expected to be saved.

A Process Certification Program was established at the Pantex Plant to incorporate modern process control techniques for the verification of product quality characteristics and certification of product acceptance. A $455,000 savings has resulted because of the reduced manpower levels required.

At the Rocky Flats Plant a new scheduling philosophy to reduce process times and minimize Work-in-Process (WIP) inventories has been implemented in Building 460. In the past year WIP inventories have been cut about one half; production process time has been reduced even more substantially, from 76 days to 31 days, for an improvement of 59 percent.

PRODUCTION AND SURVEILLANCE CONSTRUCTION

A total of 21 production and surveillance construction projects were completed during FY 1989, with a total estimated cost of over $300 million. These projects included W88 TRIDENT II warhead production facilities at two locations, Consolidated Non-Nuclear Manufacturing Facility at Rocky Flats, High Explosive Subassembly Facility at Pantex, Explosive Component Test Facility at Mound, two ES&H projects, five projects to provide safeguards and security upgrades, and several projects to restore and maintain the utilities and equipment at the production plants.

There were two new project starts, including the Plutonium Recovery Modification Project at Rocky Flats, and five new subproject starts for the Facilities Capability Assurance Program (FCAP).

WEAPONS RESEARCH, DEVELOPMENT, AND TESTING

Accomplishments in weapons research and development are numerous. Noteworthy this year is the development of single chip, radiation hardened 64 bit random access memories by Sandia National Laboratories, which will have wide defense applications. More closely related to the weaponization work was Sandia's completion of a successful ballistic test of an inerted Interim Earth Penetrator Weapon, at the Tonopah Test Range in Nevada. The weapon was operable after a *Deleted* drop onto hard ground. In order to reduce the likelihood of plutonium scattering in an accident, fire resistant pits have been developed

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Two unique experimental facilities, the Saturn X-Ray Simulator capable of 20 to 30 trillion watt pulses and Hermes III Gamma Ray Simulator are now operational at Sandia National Laboratories in Albuquerque. Saturn achieved over 500,000 joules of soft x-rays while Hermes III is now capable of firing 3 to 5 shots per day onto targets as large as 25 centimeters. Both facilities are important parts of our weapons effects simulation capability which help determine how our weapons would react in a hostile, anti-weapon environment.

Finally, seven of the "R&D 100" awards -- a worldwide competition to reward innovation sponsored by "R&D Magazine" -- went to DOE weapons laboratories. Scientists at Sandia, Los Alamos and Livermore National Laboratories, and the Y-12 Plant at Oak Ridge received awards. Two examples are the Reflective X-Ray Mask used to produce high density integrated circuit patterns developed at Lawrence Livermore, and parallel computing software developed at Sandia which will, for certain applications, permit up to a 1,000-fold increase in computing speed compared to present day supercomputers.

WEAPON DEVELOPMENT, ENGINEERING AND CERTIFICATION

In the area of weapon development, engineering and certification, in FY 1989 we worked with the DOD to complete Phase 2 warhead feasibility studies for the Short Range Attack Missile - Tactical (SRAM-T) and the Follow-on To Lance (FOTL) missile systems. Both the Phase 2 and the Phase 2A for the SRAM-T were completed in half of the normal time by use of existing technology and use of modified and existing component designs from the B61-3&4, W85, W88, and W89. The Phase 2 studies for SRAM-T and FOTL resulted in the selection of a common warhead for both weapon systems, with an estimated savings of at least $170 million in production and surveillance costs. Selection of the common warhead will also allow DOE to meet the systems' unusually short lead time to Initial Operational Capability in *Deleted*

Use of technology developed in the technology base is permitting low risk improvements to the SRAM-T/FOTL warhead. Previous investigation of

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These systems are also benfitting from technology advances in plutonium containment in a fire environment.

TESTING

Underground nuclear testing is an integral part of the overall weapons research and development effort. Understanding the complex processes by which nuclear energy is released in a nuclear explosive is critical to improving nuclear weapon performance. These processes can only be produced in a nuclear test. As a result, nuclear testing represents the highest priority experimental activity in nuclear weapons research and development.

In fiscal year 1989, the Department conducted *Deleted* underground nuclear tests and was heavily involved in fielding another two tests sponsored by the Department of Defense to study nuclear effects. The *Deleted* DOE-sponsored tests included several with multiple experiments and addressed nearly every aspect of DOE's national defense mission.

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These underground tests give us data critical to the progress of nearly every aspect of nuclear R&D. They also help assure the continued technical preeminence of our weapon scientists. These scientists make an irreplaceable contribution to our confidence in the nuclear deterrent.

ANNUAL REPORT ON REDUCED RELIANCE ON TESTING PROGRAM

The Department's first annual report to Congress on the Program Status of Preparations for Further Limitations on Nuclear Testing was completed and sent to the Senate and House Armed Services Committees in February, 1990. This was in response to Section 1436 of the National Defense Authorization Act of Fiscal Year 1989 which requested an annual report on the progress made in the program for assuring stockpile reliability, safety, and continued deterrent effect in the event of further testing limitations.

The report reflects the fact that the majority of the elements requested by Section 1436 have been in place and operating as implicit parts of the nuclear weapons program for many years. For example, the weapons program already includes a vigorous stockpile inspection and nonexplosive testing program requiring frequent warhead disassembly and component testing as well as joint DOE/DOD laboratory and flight testing for each weapon in the stockpile. Partially in response to Section 1436, the Department has initiated two new studies: an Above Ground Experimental Capability (AGEX) study and a Remanufacturing/Substitution study. In addition, some of our weapon program activities have been given greater emphasis, such as the area of weapon performance predictive capability.

AGEX STUDY

The AGEX Study will result in a ten to twenty year development plan. The Plan will provide enhanced capabilities for laboratory scale experimentation which simulate phenomena and ranges of performance helpful in developing improved understanding of nuclear weapon design and effects. The first phase of the AGEX

Study, which determines the broad requirements for such a technology base, has been completed. The second phase will establish the priorities, and is expected to be completed next year.

REMANUFACTURING/SUBSTITUTION STUDY

The Remanufacturing/Substitution study will determine the feasibility and anticipated problems of remanufacturing weapons or using an existing weapon design to replace a stockpile weapon. This is intended to improve confidence in newly-built weapons in the event of future limitations on nuclear testing. The Remanufacture study should be completed approximately September, 1990.

While we believe there will be some progress in the test limitations readiness program, it is our view that there will be bounds on what can be accomplished. Nuclear testing will be required as long as we rely on a nuclear deterrent.

INERTIAL FUSION

The inertial fusion program is an integral part of the Weapons Research, Development, and Testing technology base. The program's research and experiments contribute to the technology base through increased understanding of the phenomena that occur during a thermonuclear explosion. A major thrust of the program is defining the feasibility and affordability of a laboratory microfusion facility. This new experimental facility would advance diagnostics, instrumentation and calibration, and weapons physics simulation and effects capabilities, but cannot substitute for actual tests of nuclear weapons. Construction could begin in the late 1990's.

NOVA LASER

The NOVA laser at the Lawrence Livermore National Laboratory (LLNL) has had its laser glass replaced with glass that is almost platinum free and has generated a pulse with energy greater than 124 kilojoules, significantly in excess of design specifications. As mentioned earlier, the laboratory also received an

"R&D 100" award for development of a reflective x-ray mask for lithography of integrated circuits. This achievement resulted as a spin-off of NOVA program development of x-ray diagnostics development. This device has commercial applications such as the replication of next-generation high density integrated circuit devices. The LLNL successfully initiated their planned *Deleted* experimental campaign by demonstrating the capability of NOVA to generate a variety of coherent laser *Deleted* in a billionth of a second time scale. Such *Deleted* should enable more efficient coupling of energy to ICF targets, thereby reducing the energy required to implode the target to fusion conditions.

PARTICLE BEAM FUSION ACCELERATOR II

The PBFA II accelerator at Sandia National Laboratories has focused an ion beam to greater than 5 terawatts per square centimeter. This exceeds the 1989 goal established by an independent program review committee. Progress is being made on Lithium ion sources, and target implosion experiments should start on PBFA II this year.

AURORA LASER

The AURORA laser at Los Alamos National Laboratory succeeded in fully integrated operations at the 100 terawatt per square centimeter level. Los Alamos is also making progress in their study of the formation of cryogenic fuel layers, a process useful in fabricating advanced ICF targets.

UNIVERSITY OF ROCHESTER

(CHART 3) The University of Rochester/Laboratory for Laser Energetics (UR/LLE) demonstrated a significant improvement in direct-drive neutron yield. Using a beam smoothing technique called "smoothing by spectral dispersion" and improved power balance among the 24 beams of the OMEGA laser, cryogenic implosion experiments showed a 10 fold increase in neutron production compared to 1988 high compression results.

Use at Rochester of a new x-ray framing camera developed by LLNL allowed UR/LLE to make 12 time sequenced images during an implosion that lasted only a nanosecond, the time required for light to travel only a foot. The UR/LLE also was awarded an R&D Magazine award for their development of a liquid-crystal polarizer/isolator used to reduce unwanted depolarization in the OMEGA laser system.

NAVAL RESEARCH LABORATORY

The Naval Research Laboratory has stopped inertial fusion experiments that use the PHAROS glass laser and is developing a KrF laser for short wavelength laser-matter interaction experiments. They are also developing their understanding of plasma instabilities so as to reduce the difference between experimental and theoretical results.

KMS FUSION, INC.

KMS Fusion, Inc. continued to supply some target components and perform other work in target fabrication in support of the overall program.

The Inertial Fusion Division completed a review by an independent group of consultants of inertial fusion target physics results to date. That review confirms the impressive progress made in the last few years and supports the program planning for the next major experimental facility, the Laboratory Microfusion Facility. The Division also issued a new 5-year program plan. An unclassified version of that plan is available. The plan was developed with strong participation of the ICF Program Managers at the laboratories and is the first ICF plan to focus on the Laboratory Microfusion Facility as the next step in the ICF program. The DOE program office conducted a review that validated the proposed OMEGA laser upgrade at the UR/LLE and also completed a preliminary technical design review for that proposed upgrade.

NUCLEAR DIRECTED ENERGY WEAPONS

Nuclear Directed Energy Weapons -- NDEW -- research is being conducted at the national laboratories as an integrated program of theory and experiment to assess the vulnerability of our current nuclear deterrent and future defensive systems to possible adversary nuclear directed energy systems.

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In the Hypervelocity Projectiles program at Los Alamos National Laboratory, the major laboratory focus in 1989 has been on above ground testing to understand better the physics of shockless plate acceleration and the critical mechanisms of plate fracture. Numerous above ground tests were performed with the fast shock tube, light gas gun, and particle accelerator examining new projectile designs and operating parameters.

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The Optical Laser programs at Los Alamos, Sandia, and Idaho laboratories will continue in FY 1991.

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EMERGENCY ACTIONS

Headquarters DOE and the DOE Accident Response Group from the Albuquerque Operations Office participated in two nuclear weapon accident command post exercises in an OCONUS location in February and May 1989. These exercises were sponsored by the Joint Chiefs of Staff. We also participated in a nuclear weapon accident command post exercise at *Deleted* in August that was sponsored by the Strategic Air Command. Headquarters, the Accident Response Group and the Federal Measurement and Assessment Center also provided stand-by support to NASA in the event of an accident involving the Galileo launch.

RESEARCH, DEVELOPMENT, AND TESTING CONSTRUCTION

Five construction projects in the Weapons Research, Development, and Testing program were completed in FY 1989, for a total estimated cost of about $125 million. These included aerial measurements facilities and Pahute Mesa roads at the Nevada Test Site, High Explosive Application Facility at the Lawrence Livermore National Laboratory, and Process Development Laboratory at Sandia. There were no new project starts in 1989.

ENVIRONMENT, SAFETY AND HEALTH

Major environment, safety, and health issues came to the forefront during FY 1989. Significant efforts were undertaken to carry out directives and programs that will implement the Secretary's initiatives to establish a "culture of excellence" within the Department, particularly as it applies to environment, safety, and health.

With this impetus, there are new organizations in place to handle environmental remedial actions, waste management, waste minimization and storage, and decontamination and decommissioning.

We have taken many steps in the Weapons Program to improve our performance in these areas. The contractor award fee criteria has been changed to relate at least 51 percent of the fee to ES&H performance. We are more broadly applying NEPA procedures to the actions we take -- developing environmental assessment and environmental impact statements for major projects such as the SNM Laboratory at Los Alamos. In response to the Secretary's invitation, the Occupational Safety and Health Administration -- OSHA -- participated in three tiger team assessments of nuclear weapons production plants.

TIGER TEAM AUDITS

Seven environmental "Tiger Team" audits have been conducted at weapons program sites -- production plants at Rocky Flats, Kansas City, Mound, Pantex, Pinellas, and Y-12 at Oak Ridge, and the Nevada Test Site. There are two more tiger team assessments scheduled for the first half of FY 1990 for the Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore.

The first seven compliance assessments have highlighted a significant number of environmental, safety, health and managerial findings and concerns. However, the assessments have clearly stated that none of the findings or concerns present an immediate risk to public health or the environment.

We have set up teams to review and evaluate corrective action plans from the seven tiger team audits. The initial analysis has pinpointed some common deficiencies among the sites.

- -- Some waste handling and storage areas are inadequate
- -- Labeling and storage of toxics needs improvement
- -- Some air monitoring procedures and equipment are outdated
- -- Spill prevention control and countermeasures plans are not always consistent with requirements

OSHA compliance officers identified deficiencies in safety programs for machine guarding, walking and working surfaces, and maintenance of electrical equipment.

As tiger team results come in, they are reviewed and evaluated, and action plans developed to address corrective action responses, schedules, and funding needs. Independent teams will scrutinize these plans, and I will prioritize and implement individual response actions to help us achieve and maintain the Secretary's goals.

These actions, together with the ongoing base program activities in environment, safety, and health are an integral and inseparable part of safe, environmentally-sound operations of all of our facilities.

SAFEGUARDS AND SECURITY

We continued to improve our program for the protection of national security assets by systematically making essential improvements to protect against the outsider and insider threats. Five line item construction projects to upgrade Safeguards and Security at the weapons production plants were completed in FY 1989. The TEC for the projects totalled $43 million at Rocky Flats, Mound, and Pantex.

4. FY 1991 BUDGET REQUEST

(CHART 4) The FY 1991 budget request is over $4.7 billion -- a 9.5 percent increase over 1990. This budget is a product of shifting priorities -- ours in the weapons program, as well as those in the larger arenas of Defense Programs and the Department of Energy. We are emphasizing formality and discipline of operations, continuing to upgrade our performance in environmental, safety and health matters, and improving our commitments to modernization and maintenance of the complex. To do this within fiscal limitations is going to mean less weapons production, less testing, and less research and development. We have formulated our programs for FY 1991 to try and provide a balance among all of these competing demands.

(CHART 5) There is an increase of over 16 percent concentrated in our production and surveillance activities to support initiatives mainly related to safety and improvements in the quality of operations. The increase in research, development, and testing activities is held to only about 1 percent. This has required us to cut back on some of the efforts at our laboratories and the Nevada Test Site.

(CHART 6) The request is also heavily weighted towards concentrating on requirements within the current five year period. This reflects environmental, safety and health activities and urgently required operational improvements at certain facilities while maintaining our commitments to the stockpile.

Less than 20 percent of our FY 1991 request will be invested to meet long term objectives -- FY 1996 and beyond. These activities include advanced concepts research, research on nuclear directed energy weapons and inertial fusion, and construction projects which will not be available for use until after FY 1996. We are working to determine the appropriate balance for the weapons program between investments for the present and for the future. It is a valuable exercise particularly in a time of constrained budgets to assure ourselves that we do not inordinately sacrifice preparation for the future to meet current objectives.

Although we have had to make some hard choices, this budget reflects the most balanced program possible.

I would like to briefly review the individual program budget requests, starting with production and surveillance.

WEAPONS PRODUCTION AND SURVEILLANCE

The Weapons Production and Surveillance budget request supports the fabrication and assembly of nuclear weapons and weapon components, and stockpile maintenance and reliability assessment. The budget request is structured into five major categories for operating expenses: war reserve new production, stockpile maintenance, stockpile evaluation, process development and other costs. Capital equipment funding for basic equipment and computers, and construction funding are separately identified.

WEAPON SYSTEMS WORKLOAD

(CHART 7) The planned total new production and stockpile improvement program output *Deleted* Under current and expected future funding, this is about the maximum we can maintain and still meet obligations in other areas such as environment, safety and health. The Departments of Defense and Energy are working to establish production requirements that are balanced and realistic in terms of current needs and take into consideration competing demands for future DOE funding.

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We would have substituted other builds and maintained our overall numerical production commitment to the DOD, but because of other high priorities, we have redirected DOE weapons production resources.

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The FY 1991 budget request supports production activities for 6 weapon systems, one new stockpile improvement program, and preproduction activities for eight other systems.

(CHART 8) The FY 1991 budget request for Production and Surveillance is $2.757 billion, an increase of $382 million -- 16 percent over FY 1990. Of that amount, $2.3 billion is for operating expenses. Production and Surveillance operating expenses provide for direct costs of producing weapons, as well as for stockpile maintenance and evaluation, and production support costs.

Within operating expenses, after allowing for escalation, direct costs increase by 9.6 percent over FY 1990 levels. Indirect costs increase by 15 percent. This increase is clearly attributable to Rocky Flats Operational Improvements ($87.7 million), Monsanto health benefits payment ($23.0 million), training accreditation ($11.5 million), new safeguards and security requirements ($2.7 million), and expanded health and safety activities ($33.9). These increases are allocated across all of the direct cost categories, and will be discussed in the context of the specific initiatives. Direct cost increases will be discussed in the Budget and Reporting categories that follow.

PRODUCTION AND SURVEILLANCE OPERATING EXPENSES

(CHART 9) War Reserve New Production funding is requested at $1.1 billion, an increase of 10 percent over FY 1990. This funding is allocated to the B61-3, B61-4/10, W80-0, W80-1, W82, B83, W88, W89, B90, Follow on to Lance, and Short Range Attack Missile - Tactical. Overall, the direct portion of these costs is estimated to increase less that inflation. The largest increase in direct costs, about $20 million between FY 1990 and FY 1991, is allocated to the B90, which is scheduled to enter production in *Deleted*

Stockpile Maintenance and Evaluation activities will support 28 systems and over *Deleted* in stockpile. The request for Stockpile Maintenance is $284.5 million, an increase of 15 percent over FY 1990. The B61-9 Stockpile Improvement Program is set to commence in *Deleted*, and consequently, direct costs associated with this program increase by about $16 million over the FY 1990 funding level.

Stockpile Evaluation activities are requested at $215.7 million, an increase of 5 percent over FY 1990. This funding provides for evaluation and testing for weapon components, weapons in production, and all systems in stockpile. The direct cost increase requested for FY 1991 is related to preproduction activities for the Follow on to Lance and Short Range Attack Missile - Tactical, as well as for the Stockpile Improvement Programs for the B61-9 and B61-6.

Process Development funding is requested to maintain the necessary technology base at the production plants to support systems in production, as well as to respond to new requirements for materials and processes for future production efforts. The FY 1991 request is $115.9 million, an increase of about 3 percent over FY 1990.

(CHART 10) The largest percentage increase requested in the Production and Surveillance program is for Other Costs. The requested 43 percent increase provides for urgently needed operational improvements at the Rocky Flats Plant, training expenses associated with new DOE Order 5480.18 on Training Accreditation, funding to continue a FY 1990 initiative to enhance the ground transportation network of safe secure transports, and funding to provide about half of the monies owed to Monsanto Company for closeout of their contract in the area of medical benefits for retirees.

ROCKY FLATS OPERATIONAL IMPROVEMENTS INITIATIVE

(CHART 11) The initiative to permit operational and facility safety and health upgrades to the Rocky Flats Plant is requested at a total of $155 million in FY 1991 -- $113.8 million in operating, $10.0 million in Capital equipment, and $31.2 million in Construction. This is above the base program amount estimated at $521.0 million. Activities will be conducted in four major areas: plant improvements, conduct of operations, environmental, and communications. The draft plan containing schedules and milestones for completion is now in preparation.

The largest component of the request -- $51.8 million -- is for facility upgrades for the site. These include utilities, upgraded sewer treatment, enhanced spill prevention for hazardous liquids, glovebox enhancements, and certain necessary administrative and support facilities to house the augmented work force.

Another $15 million is requested for plutonium residue reduction and recovery, including a drum storage facility.

About $27 million is requested for health and safety of operations. This will provide programs and equipment to enhance dosimetry, decontamination, health physics support, industrial hygiene, and radiation safety, and a facility to house environment, safety and health laboratories.

The remainder of the initiative is made up of literally hundreds of actions --large and small -- to respond to review and audit team findings. We are doing everything from replacing filters and valves to assuring that documentation is properly prepared -- all of it to assure that we operate safely and effectively within the letter and spirit of applicable laws, regulations and agreements.

Closely related to this request is the $23 million initiative requested for training, consistent with the requirements of the new DOE order on training for personnel operating non-reactor nuclear facilities. These funds will be targeted at Rocky Flats for FY 1991.

(CHART 12) Another initiative supports our commitment to enhance nuclear weapon safety. The request contains $19.7 million to expand DOE's safe secure transportation network with 12 additional safe secure trailers, armored tractors, escort vehicles and additional couriers. Currently, some weapons in DOE custody which contain conventional high explosive are shipped by the DOD military airlift command. This initiative will permit ground shipment, within the contiguous United States of all these weapons by 1993. This change will significantly reduce the risk of plutonium dispersal in the event of a transportation accident.

Finally, we have requested $23 million to partially fund a contract closeout liability with the Monsanto Corporation. This will fund health benefits for Monsanto retirees from the Mound, Ohio, plant. The remaining liability will be funded by future appropriations.

(CHART 13) Capital expenditures for Weapons Production and Surveillance are requested to increase by about 13 percent. The Capital Equipment request totals $128.6 million, of which $15.9 is earmarked for major automatic data processing equipment acquisitions, and $9.2 million is planned for three Major Items of Equipment (MIE).

PRODUCTION AND SURVEILLANCE CAPITAL EQUIPMENT

The MIE's include one jet aircraft to replace the King Air Turbo propeller aircraft essential to meeting Albuquerque Operations Office's emergency response missions, with a total estimated cost of $3.5 million; hydrofluorination equipment for Rocky Flats to replace 8 year old systems which are expected to fail before FY 1995 due to the harsh chemical processes involved in aqueous purification and recovery of plutonium, at $4.1 million; and a Computed Tomography System for the Kansas City Plant to provide graphic three dimensional displays for materials cross sections, which is requested at $1.56 million. The requested ADP items are mainly general purpose computers for central computing capabilities at the production plants.

The request for Basic Equipment totals $112.7 million, including funding requested for the MIE's. This is an increase of 15 percent over FY 1990, however, most of the increase is attributable to support for the Rocky Flats operational improvements initiative ($10 million), and the Transportation Safeguards initiative ($2.3 million). This leaves only a 2.6 percent increase to replace and upgrade critical equipment throughout the production complex.

PRODUCTION AND SURVEILLANCE CONSTRUCTION

(CHART 14) The request for Construction totals $328.5 million. Seven new project starts are requested for FY 1991. Two of the projects will provide specialized plant facilities modifications and standard equipment for producing Follow on to Lance and Short Range Attack Missile-Tactical warheads at the weapons plants. One production support project is requested to replace PCB transformers and equipment at the Kansas City Plant. Three new ES&H projects are requested to provide a licensed hazardous waste incinerator and a health calibration facility at the Mound Plant, and to upgrade the Criticality Alarm and Annunciation System at Rocky Flats. Finally, one new safeguards and security project is requested which contains seven subprojects to address insider and outsider threats against SNM at the Mound Plant.

FACILITIES CAPABILITY ASSURANCE PROGRAM

(CHART 15) In addition, there are ten new subproject starts requested under the Facilities Capability Assurance Program -- FCAP -- to continue the systematic replacement of critical areas throughout the production and surveillance complex. Four are utility projects -- electrical and water. Four others are environment and safety related, including a fire station and a ventilation system. The remaining two are programmatic, for high explosives formulation and energetic materials support.

PLUTONIUM RECOVERY MODIFICATION PROJECT

The most important ongoing construction project in the weapons complex is the modification of Building 371 at Rocky Flats. The Plutonium Recovery Modification Project is needed to replace outdated and unreliable facilities--Buildings 771 and 776-- which cannot be upgraded to meet today's environmental and safety criteria. Regardless of whether the DOE ultimately relocates plutonium processing from Rocky Flats, this project is needed for about the next 20 years to provide reliable processing capability using updated chemistry, to reduce waste generation, and to help eliminate backlogged residues now stored in drums.

(CHART 16) We believe that there are no cost effective or technically feasible alternatives to completing this project. Building a new facility at another site would take 8 to 10 years, and cost well over $1 billion. Other DOE plutonium sites, such as Tech Area 55 at Los Alamos, and the new special recovery facility at Savannah River, have capacities less than half of annual requirements, and limited capabilities to process certain feed materials and site returns. Additionally, there would be a significant increase in the risk and cost associated with many more cross country shipments of plutonium and plutonium residues. And there are some residues which cannot be shipped offsite at all. Processing residues at the point of origination, in Building 371, is the most sound, safe, and secure approach.

The project is undergoing peer review to establish a detailed technical baseline. The current TEC has increased to $500-600 million, up from $371 million established in 1987 for inclusion in the FY 1989 budget. About $66 million of the increase is attributable to delays in construction initiation, while $135 million is for additional safety systems, redundant ventilation, and backup power and instrumentation required by recent DOE safety orders. An Environmental Impact Statement is being prepared for the project.

The FY 1991 request is $65 million to continue preliminary design and initiate procurement of key long lead items. The PRMP project is now a solid technical baseline. There is a reasonable near-term cost and schedule, and design is progressing. The EIS process is about to start, and with a positive record of decision, construction will start in 1991. Project completion is schedule for 1997. We are striving to meet the urgent need within DOE for safe, modern, reliable plutonium processing capacity.

WEAPONS RESEARCH, DEVELOPMENT, AND TESTING

(CHART 17) The Weapons Research, Development and Testing (RD&T) program plays an essential role in maintaining the credibility of the U.S. nuclear deterrent. The program develops new weapons and also determines what is possible for the future. The latter area includes threat assessment which will become increasingly important.

In addition to developing new weapons, RD&T responsibilities in maintaining and evaluating the current stockpile include operational reliability, safety, testing, repair, modernization, and dismantling. The RD&T program plays an important role in arms control and verification research. This role may well increase if arms control efforts are successful -- and place additional demands on our resources.

The laboratories are also an important asset in providing the research and development to support our commitment to remediate facilities and to conduct environmentally sound operations.

The FY 1991 request is slightly below the FY 1990 level of effort. We are in transition -- changing the emphasis in weapons development from yield, size and weight towards survivability, safety, security and assured command and control. We are increasing the role of laboratory simulation -- with above ground experimental capabilities, including computers, as we are preparing for a future which may be less reliant on underground testing. We are deemphasizing work on short range and tactical systems in favor of continuing to improve our strategic systems. We are seeking to refine and focus our emphasis on threat assessment throughout the RD&T activities.

RD&T LABORATORY EMPLOYMENT

(CHART 18) Research, development and testing-funded employment at the laboratories is projected to decline about two to three percent from FY 1990 to FY 1991, a reduction of about 250 full time equivalents. The decline in the number of FTE's could be viewed as one indication of the erosion of technical skills which constitute the technology base and nuclear competence of the weapons program. Such skills are not available in the private sector, and when they are lost, they take many years to replace.

The downward trend of FTE's utilized in the weapons RD&T program began in 1985. This is because changes in weapons program priorities have resulted in a shift towards areas such as safeguards and environment, safety, and health.

Our current position is based upon the necessity to balance overall priorities within the budget. For the laboratories, priority has been given to maintaining the stockpile, to threat assessment, and to arms control verification tasks.

TESTING

(CHART 19) Deleted underground nuclear tests are planned in FY 1991. We view this level with concern. It is well below the 20 tests per year the weapons laboratories believe are needed to perform their mission responsibilities. It is important to recognize that in a testing program this small, we have little or no flexibility to respond to technical problems or major design changes.

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RESEARCH, DEVELOPMENT AND TESTING BUDGET

(CHART 20) The FY 1991 request for Research, Development and Testing activities is $1.885 billion, an increase of 1 percent over FY 1990. The Core program is maintained at $1.5 billion, a 3 percent increase over FY 1990. However, the Nuclear Directed Energy Weapon research and Inertial Fusion efforts are requested at levels below that required to sustain the FY 1990 level of effort. This reflects shifting priorities in the weapons program, and the necessity to allocate scarce funding resources to other high priority activities.

CORE PROGRAM

(CHART 21) The Research, Development and Testing Core program provides funding to support the Technology Base, Weapons Development Engineering and Certification, Testing Capabilities and Special Projects, including emergency response capabilities and activities in support of the Marshall Islands.

Technology Base funding is requested at $505 million. This will continue activities primarily at the weapons laboratories in the critical sciences and technologies, and operate facilities needed for the program.

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Weapons Development Engineering and Certification activities support weaponization, Phases 1 through 4, as well as stockpile surveillance and maintenance activities. The request for FY 1991 is $468 million, an increase of 4.5 percent over FY 1990. The request will provide for Phase 3 development activities on the W89 SRAM II, B90 ND/SB, FOTL and SRAM-T, as well as Phase 1,2 and 2a studies.

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Testing Capabilities funding is requested at $187 million to support test diagnostics, containment, and weapons phenomenology, as well as maintenance of the Nevada Test Site. This request is consistent with planned test levels for FY 1991.

About $90 million is requested for Special Projects in FY 1991. These projects include ongoing Nuclear Emergency Search Team -- NEST -- activities and other emergency response capabilities; funding for research on SNM detection and environmental issues; and support for the Historically Black Colleges and Universities research program. The majority of the increase requested for FY 1991 --$10 million -- is to continue an aggressive Technology Transfer program at the weapons laboratories which was previously funded in the Nuclear Safeguards and Security program. Marshall Islands support, contained in the Testing program budget, is requested at about $5 million for FY 1991. This is to continue RMI personnel studies and medical follow-up, as well as environmental surveillance of the area. The remainder of the recurring activities in the account would be maintained at about the FY 1990 level of effort.

NUCLEAR DIRECTED ENERGY WEAPONS

(CHART 22) The request for nuclear directed energy weapon research is $191.9 million, a decrease of $22.5 million or 10 percent below FY 1990 levels. This represents a significant scaling back of the program from FY 1989 levels - due in part to reduced FY 1990 appropriations, changes in the construction program, and shifts in priorities. However, the program remains a vital element in DOE's ability to perform weapons threat assessment.

Investigations will continue on three major concepts - x-ray laser, hypervelocity projectiles, and optical frequency lasers, as well as studies on vulnerability, lethality and countermeasures and systems.

The program will concentrate on completing ongoing research and data analysis from 1989 and 1990 tests. New research and development, as well as underground testing plans, have been scaled back consistent with overall priorities. The x-ray laser program is continuing materials and component research, with the early objective of being able to develop a complete laser array of elements that would match predicted output. The Hypervelocity Projectiles program conducted by Los Alamos and Sandia is strongly pursuing conventional high explosive simulation techniques and other laboratory simulation devices to research plate drive for hypervelocity weapon development.

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INERTIAL FUSION

(CHART 23) The FY 1991 budget request for Inertial Fusion activities is $157.9 million in operating expenses and $8.9 million in capital equipment. The budget level has been reduced below FY 1990 because of changes in program priorities. Program activities will continue at a reduced level of effort from FY 1990. The NOVA experimental program at Lawrence Livermore laboratory will continue. Developmental work on the Krypton Fluoride laser at Los Alamos Laboratory will also continue. Target experiments with the PBFA-II accelerator will be conducted. Continued target fabrication, development and delivery will be supported by the program's support contractor. Funds are provided to continue support at the University of Rochester and the Naval Research Laboratory. The requested budget level does not support the University of Rochester proposal for upgrade of the OMEGA laser in FY 1991, again because of program priorities. The Congress, in FY 1989 legislation, directed an independent review of the Inertial Fusion program. The National Academy of Sciences conducted the review, and submitted an interim report to the Congress in January, 1990, which was supportive of the program and made technical recommendations about the pace and or continuation of selected research and development efforts contributing to the decision to build a laboratory microfusion facility.

RESEARCH, DEVELOPMENT AND TESTING CAPITAL EQUIPMENT

(CHART 24) Capital Equipment funding supports basic equipment replacement and upgrade at the laboratories and the Nevada Test Site, as well as major items of automatic data processing equipment for the laboratories and two major items of equipment (MIE). The MIE's include $3.5 million requested for a Global Positioning Satellite Translation Ground Station to receive signals from test vehicles to determine time and space position, at Sandia Laboratory; and $3.3 million requested for a Radio Communications System at Los Alamos to enhance two way radio communications during emergencies. Nine major computers are included in the request of $29.1 million for ADP, including final payments on two supercomputers, storage devices and network equipment.

RESEARCH, DEVELOPMENT AND TESTING CONSTRUCTION

(CHART 25) The Construction request for RD&T is $150 million. There are six new project starts requested in the Research, Development and Testing programs --- all contained in the facilities revitalization line item.

(CHART 26) Three projects are Utilities/Infrastructure Support Facilities at the labs and Nevada Test Site; electrical power system upgrades at Lawrence Livermore; replacement and realignment of the main electrical service and switchgear at Sandia Livermore; and upgrading of power distribution systems at the Nevada Test Site. Three others are programmatic projects. The Weapons Subsystem Laboratory at Los Alamos will consolidate SNM activities from aging and dispersed facilities. The Reactor Technology Center at Sandia Albuquerque will provide a gamma irradiation facility, light laboratories and offices. The Crane and Drill Rig Certification Building at the Nevada Test Site will provide needed facilities for servicing heavy equipment now performed outside.

SPECIAL NUCLEAR MATERIALS LABORATORY

(CHART 27) The largest ongoing project in the RD&T program is for the SNM laboratory at Los Alamos National Laboratory. The project is to replace the aging chemistry and metallurgy research --CMR-- building, which is over 35 years old. The project also includes the decontamination and partial refurbishment of the old CMR building.

The project is needed to ensure long term, reliable safe and secure operations for research and characterization of plutonium processing. The new laboratory is the final step in integrating, at Technical Area 55, all plutonium operations at the laboratory. We believe that the new superior research capability for weapons development and for prototype processing systems will better utilize the limited and high cost plutonium resources.

The project has recently been rescoped and revalidated to integrate laboratory plutonium R&D operations at Technical Area 55 and to provide supporting infrastructure, including a waste pretreatment facility and enhanced security. The new cost estimate for the project is expected to range from $370-410 million. The project was begun in 1988. The FY 1991 request is $20.6 million. Currently, the DOE is preparing an environmental impact statement which is expected to be completed in Spring, 1991. The requested funding will support the EIS, and engineering and project management and support. To compete the project, we must develop a funding strategy within expected budgetary restrictions.

ENVIRONMENT, SAFETY AND HEALTH CONSTRUCTION

(CHART 28) There are seven line item projects in the Production and Surveillance program in this category for FY 1991. The requested funding is $21.4 million. There are no projects in this category in the RD&T programs.

Three new starts are requested for FY 1991. Project 91-D-125, ES&H Enhancements at Mound, will provide a hazardous waste incinerator and environmental buffer zone; Project 91-D-126, Health Physics Calibration Facility at Mound, will provide for repair and calibration of health physics and dosimetry equipment; and, Project 91-D-127, Criticality Alarm and Production Annunciation Utility Replacement at Rocky Flats is a safety project. Continuing projects include 4 subprojects under the 90-D-126 line item for ES&H enhancements to provide operational improvements at the Rocky Flats Plant.

SAFEGUARDS AND SECURITY CONSTRUCTION

(CHART 29) As result of the initiative to improve our overall protection posture against threat of theft by outsiders, our facilities have gone through a comprehensive program of significant physical security upgrades in the recent past. The FY 1991 budget request for Safeguards and Security construction continues with that program.

The FY 1991 request of $24.5 million supports ongoing construction projects: at Los Alamos National Laboratory, Project 88-D-104, Safeguards and Security Upgrade, Phase II; at Lawrence Livermore National Laboratory, Project 87-D-104, Safeguards and Security Enhancement II; Project 88-D-123, Security Enhancements at the Pantex Plant; and Project 85-D-105, Combined Device Assembly Facility at the Nevada Test Site. A new start, Project 91-D-124, provides upgrades at the Mound facility to address insider and outsider threats against SNM and production facilities.

PROGRAM DIRECTION

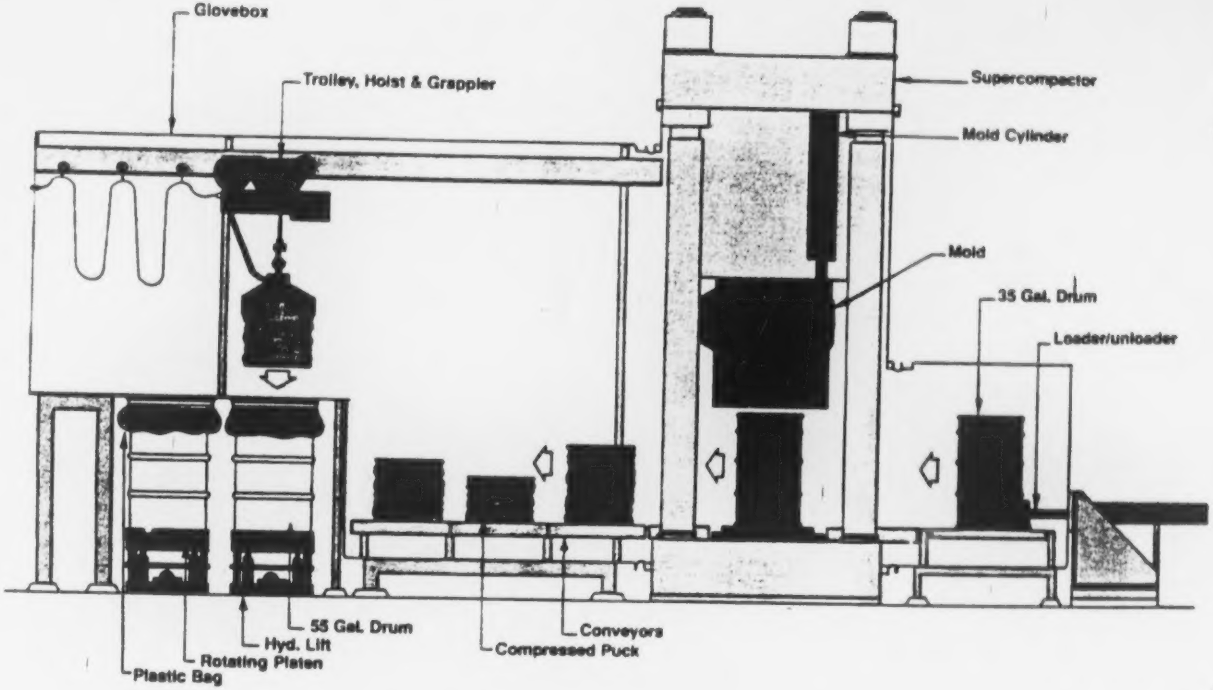
Program Direction funding contained in the weapons programs account provides funds for personnel and contractual services-related expenses for the Office of the Assistant Secretary for Defense Programs, Deputy Assistant Secretary for Planning and Resource Management, Deputy Assistant Secretary for Military Application, Albuquerque and Nevada Operations Offices, and the Offices of Security Evaluation and Emergency Operations. The Community Assistance Program at Los Alamos, New Mexico, as required by P.L. 94-187, is also provided by this account.

The FY 1991 budget request is $106.4 million, 7 percent above the FY 1990 level. This will support 10 additional FTE's and additional contractual support for oversight related to environmental, safety and health matters.

SUMMARY

In closing, I want to assure you that we are committed to maintaining the nuclear deterrent -- a keystone of our national security. We are also committed to safe and secure operations -- safe for our employees and for the public. And finally, we are committed to maintaining a viable nuclear weapons complex -- to assure that we meet our nation's needs today, and modernize to meet tomorrow's needs as well. I thank you for your support in the past, and seek your support for the funding request presented to you today.

CHART 1


Glovebox
Trolley, Hoist & Grappler
Supercompactor
Mold Cylinder
Mold
35 Gal. Drum
Loader/unloader
55 Gal. Drum
Hyd. Lift
Rotating Platen
Plastic Bag
Conveyors
Compressed Puck

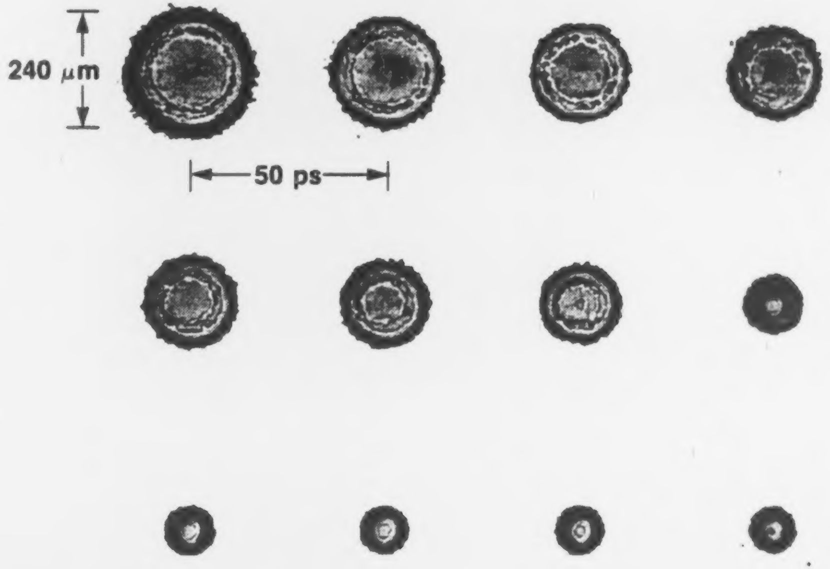
Zeren 4/89

Supercompactor and Repackaging Facility

Loadout Elevation

CHART 3

Multiframe Ultra-High-Speed X-Ray-Framing Images of High-Convergence, Direct-Drive Implosion Demonstrate Improved OMEGA Irradiation Uniformity



E5174

CHART 2
D-5 Trident II

CHART 4

TOTAL FUNDING REQUEST
($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
RESEARCH, DEVELOPMENT, AND TESTING	$1,839.4	$1,863.8	$1,884.6
PRODUCTION AND SURVEILLANCE	2,103.9	2,374.5	2,757.0
PROGRAM DIRECTION	83.2	99.4	106.4
TOTAL WEAPONS	$4,026.5	$4,337.7	$4,748.0

BUDGET HISTORY

CHART 5

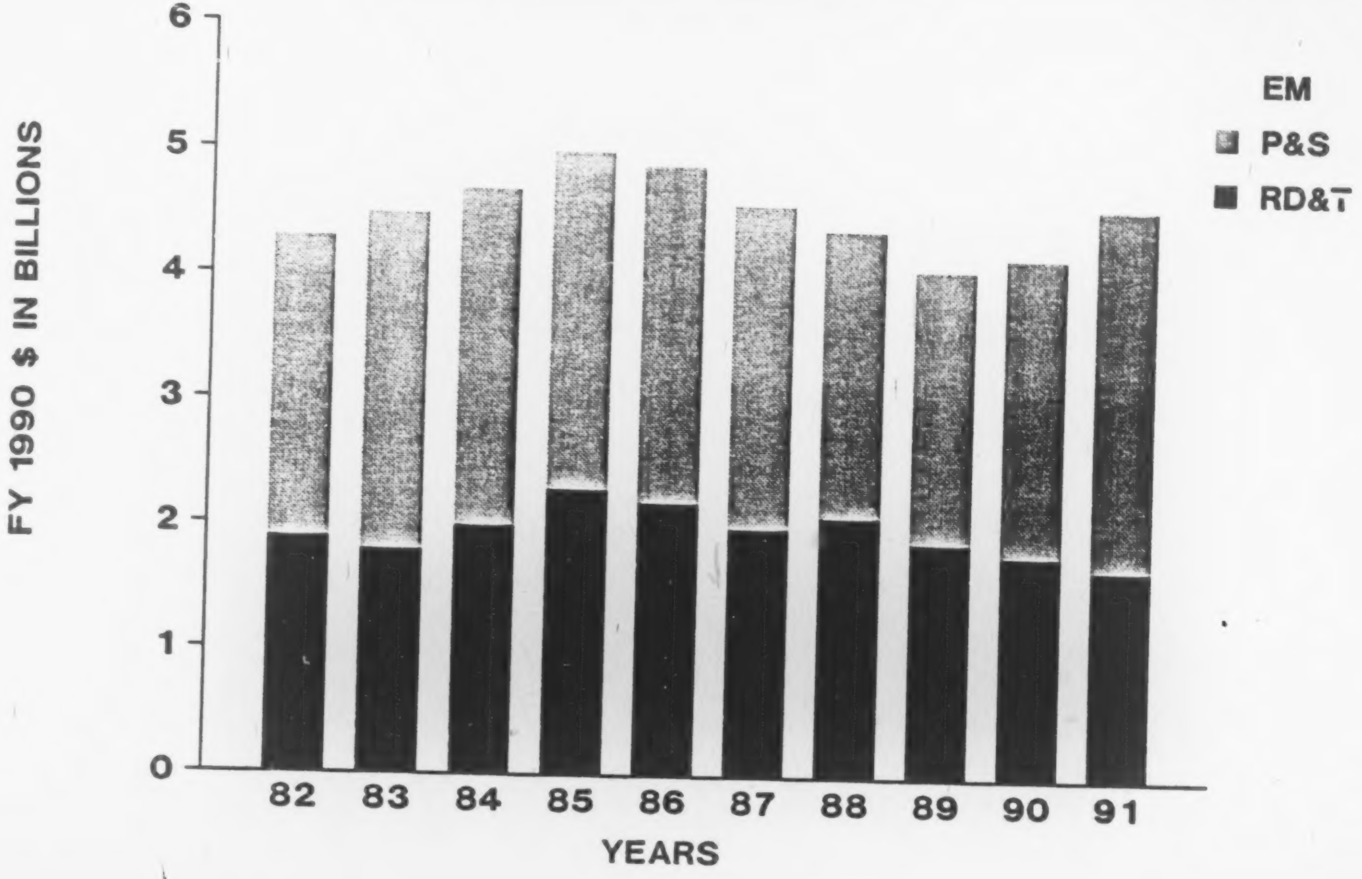
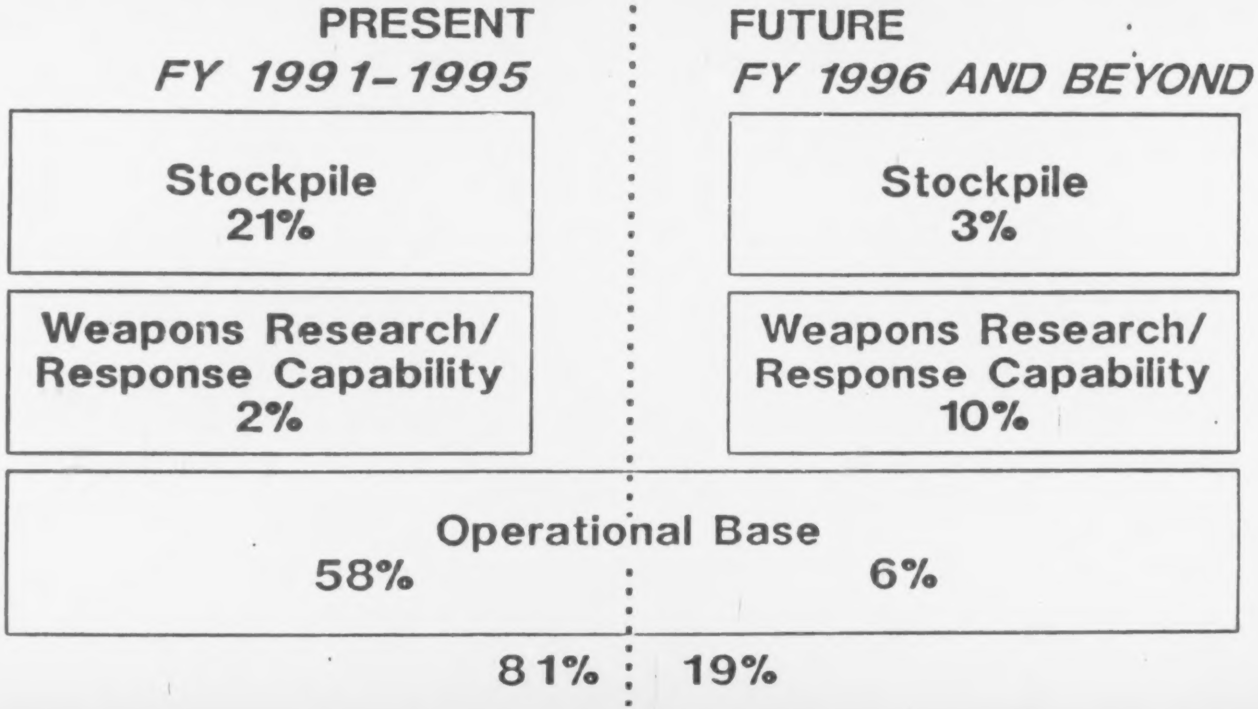


CHART 6

PROGRAM BALANCE BETWEEN PRESENT AND FUTURE AND AMONG PROGRAM ELEMENTS:



	PRESENT *FY 1991–1995*	FUTURE *FY 1996 AND BEYOND*
Stockpile	21%	3%
Weapons Research/ Response Capability	2%	10%
Operational Base	58%	6%
	81%	19%

PRODUCTION AND SURVEILLANCE CHART 8
TOTAL FUNDING
($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
OPERATING EXPENSES	$1,793.7	$1,968.2	$2,299.9
CAPITAL EQUIPMENT	103.8	113.4	128.6
CONSTRUCTION	206.4	292.9	328.5
TOTAL P&S	$2,103.9	$2,374.5	$2,757.0

CHART 9

PRODUCTION AND SURVEILLANCE
TOTAL OPERATING EXPENSES
($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
WAR RESERVE			
NEW PRODUCTION	$ 918.1	$ 996.0	$1,100.3
STOCKPILE MAINTENANCE	220.7	247.0	284.5
STOCKPILE RELIABILITY	189.4	205.1	215.7
PROCESS DEVELOPMENT	100.8	112.6	115.9
OTHER COSTS	364.8	407.5	583.5
SUBTOTAL P&S OE	$1,793.8	$1,968.2	$2,299.9

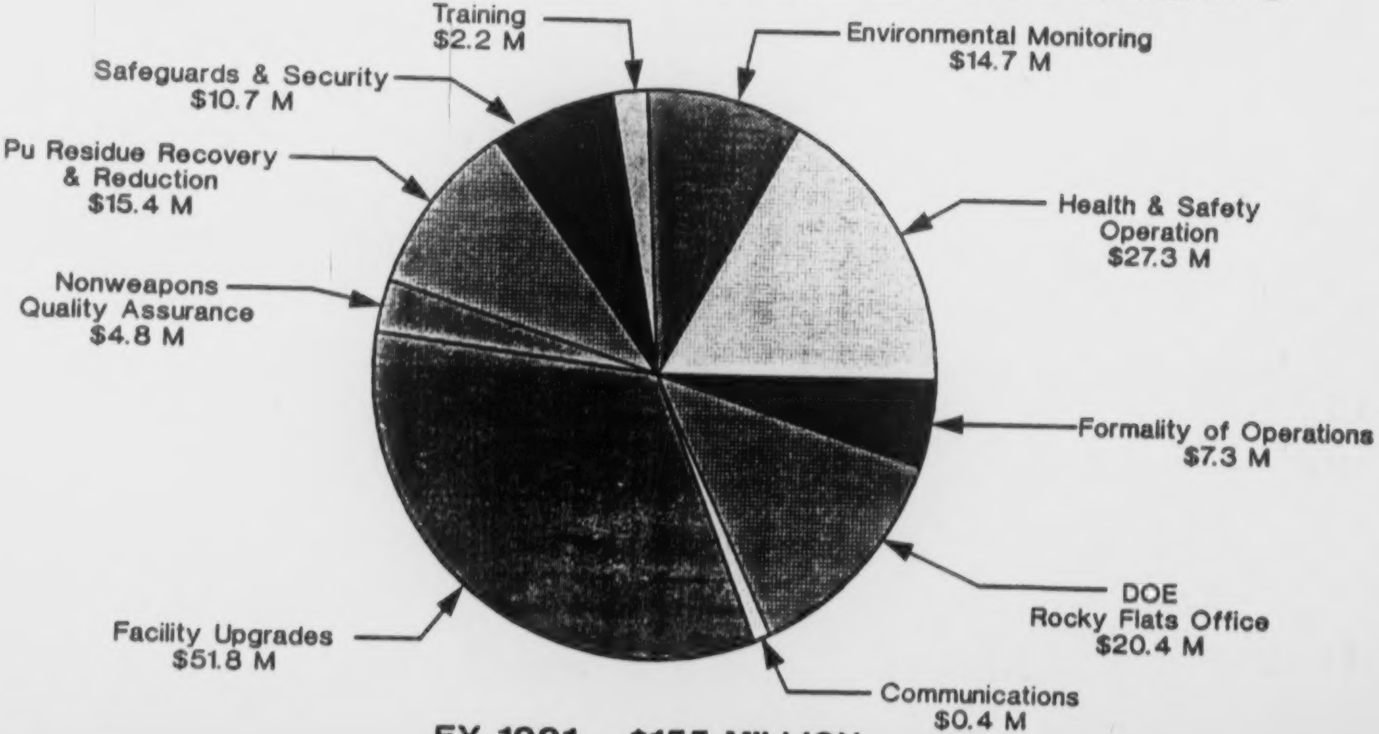
CHART 10

PRODUCTION AND SURVEILLANCE
OTHER COSTS
($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
NUCLEAR MATERIAL RECYCLE AND RECOVERY	$ 232.0	$ 267.2	$ 380.1
FIELD ENGINEERING AND TRAINING ACTIVITIES	5.2	5.1	5.5
SECURE TRANSPORTATION	57.3	62.9	87.0
FACILITY STARTUP/STANDBY	15.7	11.2	19.1
MISCELLANEOUS	54.6	61.1	91.7
TOTAL OTHER COSTS	$ 364.8	$ 407.5	$ 583.4

CHART 11

ROCKY FLATS OPERATIONAL IMPROVEMENTS



FY 1991 - $155 MILLION

TRANSPORTATION SAFEGUARDS

CHART 12

- o REQUIREMENT: ELIMINATE AIR SHIPMENTS OF WEAPONS WITH CONVENTIONAL HIGH EXPLOSIVE
- o EXPANSION OF GROUND TRANSPORTATION FLEET REQUIRED:
  - 12 SAFE SECURE TRAILERS AND CONVERSION COSTS
  - 15 CONVENTIONAL TRACTORS AND CONVERSION COSTS
  - COMMUNICATION EQUIPMENT
  - COMPUTER EQUIPMENT AND SUPPORTING SOFTWARE

CHART 13

WEAPONS PRODUCTION AND SURVEILLANCE
CAPITAL EQUIPMENT SUMMARY
($ IN MILLIONS)

	1989	1990	FY 1991 REQUEST
BASIC EQUIPMENT	$ 78.4	$ 84.9	$103.5
MAJOR ITEMS OF EQUIPMENT	10.4	13.0	9.2
COMPUTERS	15.0	15.5	15.9
TOTAL	$103.8	$113.4	$128.6

CHART 14

PRODUCTION AND SURVEILLANCE CONSTRUCTION SUMMARY

($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
PROGRAMMATIC CONSTRUCTION			
WEAPONS SYSTEMS	$ 26.0	$ 48.5	$ 40.8
FAC. CAPAB. ASSUR. PROGRAM	79.3	81.9	131.8
PRODUCTION SUPPORT FAC.	50.1	105.2	78.8
GENERAL PLANT PROJECTS	26.7	24.3	36.4
TOTAL PROGRAMMATIC CONSTR.	182.1	259.9	287.8
ENVIRONMENT, SAFETY AND HEALTH	14.0	27.6	21.4
SAFEGUARDS AND SECURITY	10.3	5.4	19.3
TOTAL P&S CONSTRUCTION	$ 206.4	$ 292.9	$ 328.5

FACILITIES CAPABILITY ASSURANCE PROGRAM FY 1991 SUBPROJECTS CHART 15
($ IN MILLIONS)

	TEC	FY 1991 REQUEST	FUTURE YEARS
REPL. ELECTRICAL SYSTEM COMPONENTS, KC	$ 12.7	$ 5.4	$ 7.3
H.E. FORMULATION FACILITY, PX	36.8	2.3	34.5
RENOV. WATER SUPPLY SYSTEM, PX	9.5	0.7	8.8
CENTRAL STEAM PLANT RENOV., RF	3.3	1.0	2.3
REPL. GRAPHITE DUST COLLECTION SYSTEM, Y-12	5.3	1.0	4.3
REFURB. POWER SUPPLY/DISTRIBUTION SYSTEM, Y-12	39.0	1.9	37.1
SITE ELECTRICAL REPLACEMENT, MD	5.0	1.0	4.0
REPL. TEMPERATURE/HUMIDITY COND. SYSTEM, KC	26.3	2.3	24.0
CENTRAL FIRE STATION REPLACEMENT, PX	6.7	0.7	6.0
ENERGETIC MATERIALS PROC/SUPPORT FAC., MD	19.9	4.0	15.9
TOTAL	$164.5	$ 20.3	$144.2

WEAPONS PRODUCTION AND SURVEILLANCE
($ IN MILLIONS)

CHART 16

PROJECT #	TITLE	TEC	PRIOR YEARS	FY 1991 REQUEST	FUTURE BA
89-D-125	PLUTONIUM RECOVERY MODIFICATION PROJECT, ROCKY FLATS PLANT	$500-600	$48.3	$65.0	$400-500

DESCRIPTION

- o RENOVATE BUILDING 371 TO REPLACE OLD, AGING, INCREASINGLY FRAGILE PLUTONIUM FACILITIES IN BUILDINGS 371 AND 776

JUSTIFICATION

- o EXISTING BUILDINGS WILL BE WELL OVER 40 YEARS OLD WHEN PROJECT IS COMPLETE AND WILL HAVE SERVED THEIR USEFUL LIFE
- o EXISTING BUILDINGS CANNOT BE FULLY UPGRADED TO MEET PRESENT SAFETY, HEALTH, SAFEGUARDS AND SECURITY STANDARDS

STATUS

- o THE TEC CONTINUES TO BE REVIEWED. A MORE REFINED ESTIMATE IS EXPECTED MARCH-APRIL 1990 AFTER ADDITIONAL STUDIES HAVE BEEN COMPLETED. THE EIS PROCESS HAS STARTED

CHART 17

RESEARCH, DEVELOPMENT AND TESTING
TOTAL FUNDING
($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
OPERATING EXPENSES	$1,530.3	$1,530.9	$1,589.5
CAPITAL EQUIPMENT	146.3	152.2	145.0
CONSTRUCTION	162.8	180.7	150.1
TOTAL RD&T	$1,839.4	$1,863.8	$1,884.6

CHART 18

RD&T LABORATORY MANPOWER
FTE'S

	1989	1990	1991
LLNL	3,742	3,516	3,392
LANL	2,645	2,512	2,447
SNL	3,606	3,394	3,336
TOTAL	9,993	9,422	9,175

CHART 20

RESEARCH, DEVELOPMENT AND TESTING TOTAL FUNDING ($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
CORE PROGRAM	$1,435.6	$1,480.2	$1,525.9
NUCLEAR DIRECTED ENERGY WEAPONS	240.3	214.4	191.9
INERTIAL FUSION	163.5	169.2	166.8
TOTAL RD&T	$1,839.4	$1,863.8	$1,884.6

RESEARCH, DEVELOPMENT & TESTING - CORE

CHART 21

($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
TECHNOLOGY BASE	$ 475.1	$ 475.2	$ 505.4
WEAPONS DEV., ENG. & CERTIFICATION	441.5	448.0	468.5
TEST CAPABILITIES	175.3	182.7	187.0
SPECIAL PROJECTS	69.7	77.2	90.0
MARSHALL ISLANDS	4.9	5.3	5.0
TOTAL	1,166.5	1,188.4	1,255.9
CAPITAL EQUIPMENT	121.6	129.8	124.9
CONSTRUCTION	147.5	162.0	145.1
TOTAL	$1,435.6	$1,480.2	$1,525.9

CHART 22

RESEARCH, DEVELOPMENT AND TESTING
NDEW - SUMMARY
($ in MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
OPERATING			
X-RAY LASER			
HYPERVEL. PELLETS		*Deleted*	
OP FREQ LASERS			
VULNERABILITY LETH AND COUNTER	6.5	5.1	2.7
SYSTEMS ANALYSIS	5.4	3.4	2.1
SUBTOTAL	$ 208.3	$ 181.9	$ 175.7
CAPITAL EQUIPMENT	16.8	13.8	11.2
CONSTRUCTION	15.2	18.7	5.0
TOTAL	$ 240.3	$ 214.4	$ 191.9

CHART 23

RESEARCH, DEVELOPMENT AND TESTING
INERTIAL FUSION
($ IN MILLIONS)

	FY 1989	FY 1990	FY 1991 REQUEST
OPERATING EXPENSES			
GLASS	$ 94.0	$ 95.5	$ 90.1
GAS	34.1	35.8	36.7
PULSED POWER	25.8	27.4	29.3
SUPPORTING ACTIVITIES	1.6	1.9	1.8
SUBTOTAL OE	155.5	160.6	157.9
CAPITAL EQUIPMENT	7.9	8.6	8.9
SUBTOTAL .IF	$163.5	$169.2	$166.8

CHART 24

WEAPONS RESEARCH, DEVELOPMENT, AND TESTING

CAPITAL EQUIPMENT SUMMARY

($ IN MILLIONS)

RESEARCH AND DEVELOPMENT	FY 1989	FY 1990	FY 1991 REQUEST
CORE PROGRAM			
BASIC EQUIPMENT	$ 56.4	$ 71.3	$ 55.4
MAJOR ITEMS OF EQUIPMENT	0	0	6.8
ADP	28.4	19.2	29.1
TOTAL CORE PROGRAM	84.8	90.5	91.3
NDEW	7.7	5.9	7.3
IF	7.9	8.6	8.9
TOTAL R&D	$100.4	$105.0	$107.5
TESTING			
CORE PROGRAM	$ 36.7	$ 39.3	$ 33.6
NDEW	9.2	7.9	3.9
TOTAL TESTING	45.9	47.2	37.5
TOTAL RD&T CAPITAL EQUIPMENT	$146.3	$152.2	$145.0

RESEARCH, DEVELOPMENT AND TESTING CONSTRUCTION SUMMARY

($ IN MILLIONS)

CHART 25

	FY 1989	FY 1990	FY 1991 REQUEST
Programmatic Construction			
Revitalization	$ 79.2	$ 94.0	$ 97.2
Other Programmatic			
Core Program	47.0	69.5	47.7
Nuclear Directed Energy Weapons	3.2	0	0
Subtotal, Other Programmatic	50.2	69.5	47.7
Total, Programmatic Construction	129.4	163.5	144.9
Environment, Safety and Health	5.4	0	0
Safeguards and Security	28.0	17.2	5.2
Total, RD&T Construction	$162.8	$180.7	$150.1

RESEARCH, DEVELOPMENT AND TESTING
CONSTRUCTION NEW STARTS
($ IN MILLIONS)

CHART 26

	TEC	FY 1991 REQUEST	FUTURE YEARS
90-D-102 NUCLEAR WEAPONS RD&T FACILITIES REVITALIZATION, PHASE III, VL			
-WEAPONS SUBSYSTEMS LABORATORY, LANL	$ 56.8	$ 2.0	$ 54.8
-ELECTRICAL POWER SYSTEM REPLACEMENT AND UPGRADE, LLNL	40.0	4.0	36.0
-POWER DISTRIBUTION SYSTEMS, NTS	12.7	1.0	11.7
-CRANE AND DRILL RIG CERTIFICATION BUILDING, NTS	2.7	1.7	1.0
-REACTOR TECHNOLOGY CENTER, SNLL	30.0	4.9	25.1
-UTILITIES UPGRADE--SANDIA MAIN ELECTRICAL SERVICE AND SWITCHGEAR, SNLL	5.3	2.0	3.3
TOTAL RD&T NEW STARTS	$147.5	$ 15.6	$131.9

WEAPONS RESEARCH, DEVELOPMENT AND TESTING
($ IN MILLIONS)

CHART 27

PROJECT #	TITLE	TEC	PRIOR YEARS	FY 1991 REQUEST	FUTURE BA
88-D-105	SPECIAL NUCLEAR MAT'LS R&D LAB REPLACEMENT, LOS ALAMOS NATIONAL LABORATORY	$370-410	$75.3	$20.6	$285-325

DESCRIPTION

- 115,000 SQUARE FOOT LABORATORY BUILDING, A 50,000 SQUARE FOOT COLD SUPPORT AND OFFICE BUILDING, A 10,000 SQUARE FOOT UTILITY BUILDING, A WASTE PRETREATMENT FACILITY AND A PROTECTED AREA ACCESS PORTAL
- PROVIDES FOR DECONTAMINATION AND PARTIAL CONVERSION/REFURBISHMENT OF CHEMISTRY AND METALLURGY RESEARCH (CMR) BUILDING

JUSTIFICATION

- MAINTAINS UNIQUE LANL ANALYTICAL CHEMISTRY/METALLURGY LABS TO IMPROVE NATIONAL NUCLEAR WEAPONS CAPABILITY
- NEW LABORATORY REPLACES AGING CMR BUILDING WITH RELIABLE, SAFE AND SECURE CENTER OF EXCELLENCE

STATUS

- THE COST, SCHEDULE, AND SCOPE OF THIS PROJECT ARE UNDER REVIEW. THE EIS PROCESS HAS STARTED

ENVIRONMENT, SAFETY AND HEALTH CONSTRUCTION
($ IN MILLIONS)

CHART 28

	TEC	PRIOR YEARS	FY 1991 REQUEST	FUTURE YEARS
91-D-125 ES&H, PHASE III, MOUND	$ 2.9	$ 0	$ 1.7	$ 1.2
91-D-126 HEALTH PHYSICS CALIBRATION FAC., MOUND	5.0	0	1.0	4.0
91-D-127 CRITICALITY ALARM & PROD. ANNUNCIATION UTIL. REPLACEMENT, RF	19.0	0	6.6	12.4
90-D-126 ES&H ENHANCEMENTS, VL	80.7	21.6	8.5	50.6
89-D-126 ES&H UPGRADE, PHASE II, MOUND	1.4	0.9	0.5	0
88-D-124 FIRE PROTECTION UPGRADING, VL	15.0	13.5	1.5	0
88-D-126 PERSONNEL RAD MONITORING LAB, VL	7.6	6.0	1.6	0
SUBTOTAL, ES&H CONSTRUCTION	$131.6	$ 42.0	$ 21.4	$ 68.2

CHART 29

SAFEGUARDS AND SECURITY CONSTRUCTION
($ IN MILLIONS)

	TEC	PRIOR YEARS	FY 1991 REQUEST	FUTURE YEARS
91-D-124 SAFEGUARDS AND SECURITY UPGRADE, PHASE III, MOUND	$ 13.8	$ 0	$ 1.1	$ 12.7
88-D-104 S&S UPGRADE, PHASE II, LANL	15.3	11.8	1.0	2.5
88-D-123 SECURITY ENHANCEMENT, PANTEX	109.7	18.6	18.2	72.9
87-D-104 S&S ENHANCEMENT, PHASE II, LLNL	29.4	24.4	0	5.0
85-D-105 COMBINED DEVICE ASSEMBLY FAC., NTS	73.6	69.4	4.2	0
SUBTOTAL, SAFEGUARDS & SECURITY CONSTRUCTION	$241.8	$124.2	$ 24.5	$ 93.1

Materials Production Activities

STATEMENT OF RICHARD W. STAROSTECKI, DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS PRODUCTION, DEPARTMENT OF ENERGY

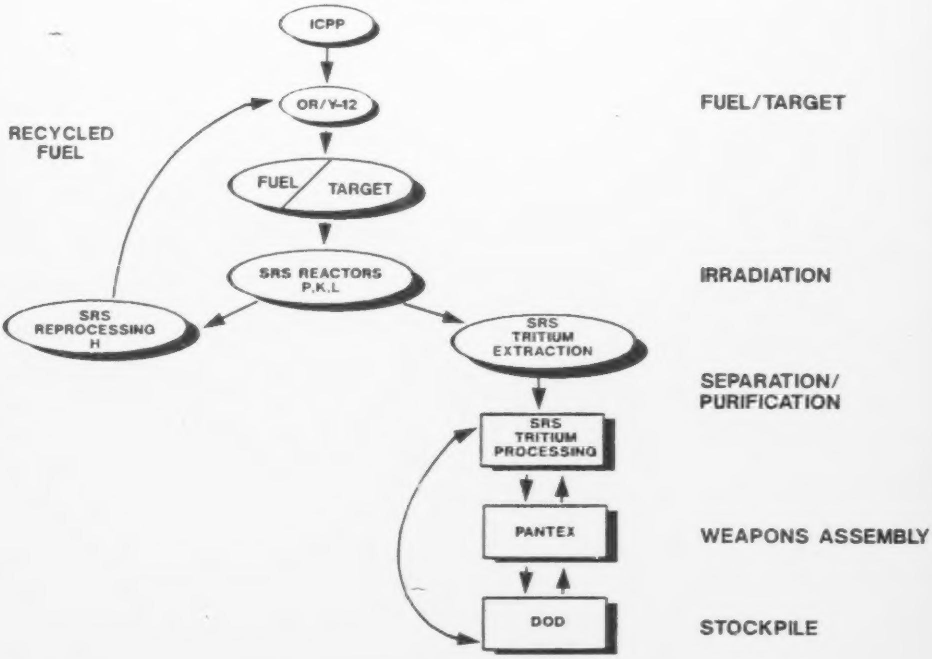
Dr. **Knuth**. The next witness that we have is Richard Starostecki, Deputy Assistant Secretary for Nuclear Materials in the Department of Energy.

Mr. **Starostecki**. Senator Johnston, Senator McClure, it is a pleasure to be here this afternoon. I have a formal statement which I would like to submit for the record and will briefly summarize my remarks.

Senator **Johnston**. Thank you.

Mr. **Starostecki**. Nuclear materials that we are dealing with are tritium, plutonium, and high-enriched uranium. In coming to this job, we recognize that two-thirds of our nuclear materials budget deals with the Savannah River site.

TRITIUM


ICPP
OR/Y-12
FUEL/TARGET
RECYCLED FUEL
FUEL
TARGET
SRS REACTORS P.K.L
IRRADIATION
SRS REPROCESSING H
SRS TRITIUM EXTRACTION
SEPARATION/ PURIFICATION
SRS TRITIUM PROCESSING
PANTEX
WEAPONS ASSEMBLY
DOD
STOCKPILE

Mr. **Starostecki**. The restart of the Savannah River reactors continues to be the top priority of the Department.

However, in reflecting on what does it take to keep the reactors operational, we have put together three charts, one for tritium and plutonium and highly enriched uranium in terms of looking at what else we really are facing in terms of making sure that we have an adequate supply for the future.

Support facilities, such as the Idaho chemical processing plant, are key to maintaining the reactors' operation. We need the product output from Idaho to provide not only highly enriched uranium for weapons program, but, also, that is the source of the fuel for the operation of the Savannah River reactors.

Similarly, the Y-12 facility at Oak Ridge is instrumental. It converts the uranium into a metal form such that we can manufacture the fuel at Savannah River.

So, this chart is intended in a very simplistic way to show the key interrelationships among these facilities and the fact that we have to support additional facilities besides those at Savannah River to assure an adequate supply of tritium.

The reprocessing, for example, of the fuel that comes out of the Savannah River reactors is conducted at Savannah River. Historically, the processed material has been shipped as liquid. We are now constructing a facility to convert the liquid to a solid form and will then ship it to Oak Ridge and convert it to metal.

We have to be successful in those endeavors; otherwise, the reactors won't operate 2 years from now. We have a 2-year supply of fuel.

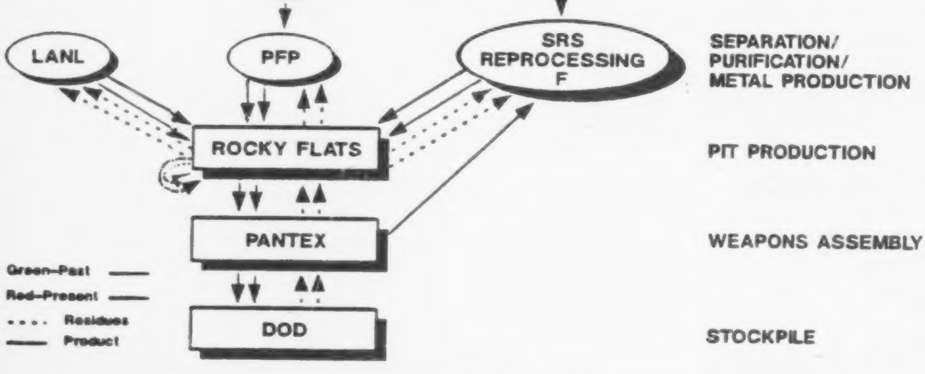
So, simple things, like where are we getting the fuel from, where are we getting the target material from, we are addressing, and we are finding that we have some pinch points.

The replacement tritium facility at Savannah River will help us with the extraction and loading of tritium. As Dr. Barker has indicated, the supply of tritium for the last 2 years has come from the stockpile. We have not been producing new tritium.

So, the role of DOD and Pantex in supplying site returns back to Savannah River has been critical.

Next slide, please.

PLUTONIUM


FMPC
OR/Y-12
FUEL/TARGET
RECYCLED FUEL
RL REACTOR N
SRS REACTORS P,K,L
IRRADIATION
PUREX
LANL
PFP
SRS REPROCESSING F
SEPARATION/ PURIFICATION/ METAL PRODUCTION
ROCKY FLATS
PIT PRODUCTION
PANTEX
WEAPONS ASSEMBLY
DOD
STOCKPILE
Green—Past
Red—Present
.... Residues
—— Product

The plutonium situation, similarly, I think is in a state of transition that many people fail to realize. What we have tried to show in this chart—and I apologize for it being so complex—the green arrows try to show how the system used to work. We used to generate virgin plutonium as shown by the green arrows. We would have the Fernald facility, which is indicated as FMPC in the upper left-hand corner, providing material for the N Reactor at Richland and for the Savannah River reactors, and we would provide fuel and depleted material from Oak Ridge/Y-12 to both Fernald and fuel for the reactors.

Similarly, the material at Hanford would be processed at PUREX. The product would be shipped to what is called the plutonium finishing plant, and the metal would subsequently be provided from the plutonium finishing plant to Rocky Flats.

A similar chain for plutonium existed at Savannah River, which we have indicated in what is called the F Canyon area. We simply show an "F" up there.

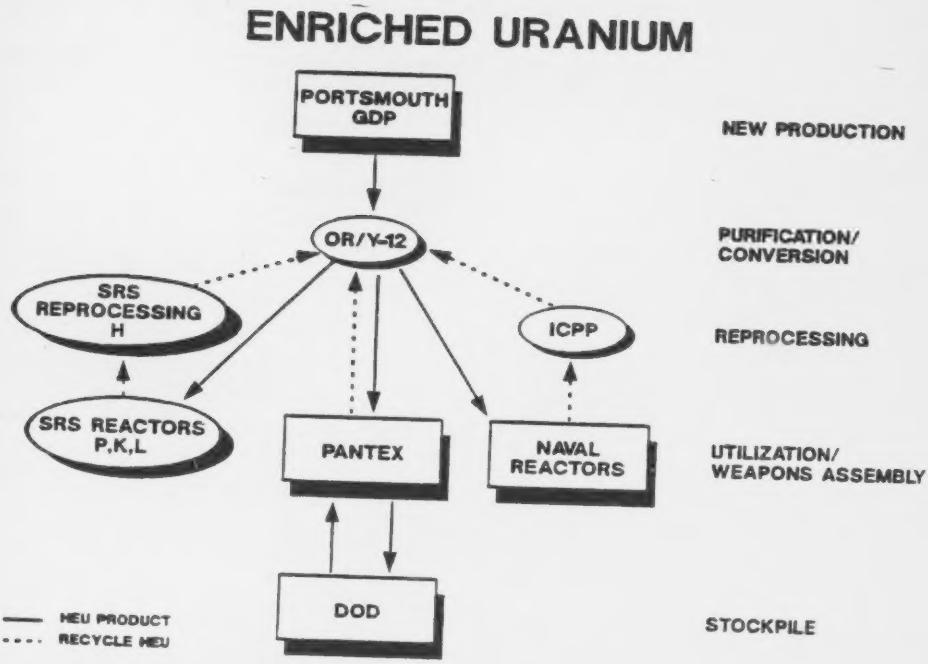
We have not been generating virgin plutonium and, in fact, have been relying on facilities as shown by the red arrows to take returns from the DOD, recover the material at Rocky Flats, and also some scrap recovery at Los Alamos. They would process residues and provide metal back to Rocky Flats.

The red arrow to the lower right from Pantex, going up to the F Canyon, indicates that we are establishing a program to allow the return of Minuteman and Poseidon warheads to Savannah River to recover the plutonium at Savannah River, and they would then, in turn, ship the metal back to Rocky Flats.

But what is of great interest to us is the dotted lines that I apologize do not show well. These try to show the waste stream.

The material that we generate as part of the manufacturing process that does contain residue plutonium we try to recover. As Admiral Barr has indicated, it occurs at Los Alamos, indicated as LANL. We have processing capability at Savannah River, and also at Richland at the plutonium finishing plant.

We have on hand some material already at Richland facilities which we hope to restart operations this summer to recover some of that material. Similarly, there are some residues at Savannah River. They cannot compare, though, with the reprocessing and recycle capability at Rocky Flats.


ENRICHED URANIUM
PORTSMOUTH GDP
NEW PRODUCTION
OR/Y-12
PURIFICATION/ CONVERSION
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ICPP
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SRS REACTORS P,K,L
PANTEX
NAVAL REACTORS
UTILIZATION/ WEAPONS ASSEMBLY
DOD
STOCKPILE
HEU PRODUCT
RECYCLE HEU

I am just giving you a brief overview since my prepared testimony has a lot of detailed discussion on budgets for individual sites.

This enriched uranium flow sheet was most interesting to me because we last purchased highly enriched uranium in 1964 from the gaseous diffusion plant, and we have been working down that stockpile. The gaseous diffusion plant provides the product to Oak Ridge, wherein we have three uses for it. [Deleted] we also provide fuel for the Savannah River reactors.

To get the right enrichments there are blending programs,since each of those programs requires a different enrichment of uranium 235. As also indicated, the reprocessing of the spent fuel from Savannah River and the spent fuel from naval reactors is recovered at Idaho and recycled.

The sheer numbers alone—and not taking into consideration any potential arms control agreements—would indicate that our stockpile is being used down to the point where we may need to purchase in fiscal year 1992 more material from the gaseous diffusion plant. The stockpile, just looking at the numbers alone, some time in [deleted] of what we have available versus what we need.

[Chart deleted.]

SUPPLY AND DEMAND SITUATION

I would like to briefly summarize, then, what this translates to in terms of what our supply and demand is.

These are very simplistic charts. We are simply trying to indicate the status of the situation.

For example, in terms of the Savannah River reactor restart, these are tentative dates. They are not yet firm. Secretary Watkins will, this month, be reviewing the schedule for the restart of the

Savannah River reactor. What we are trying to portray here is the blue line illustrates that if we don't have a new supply of tritium, we eventually aren't even capable of maintaining [deleted].

Just to maintain the pipeline viability, we need to have tritium gas in supply pipes and reservoirs to fill bottles. If we don't [deleted] we no longer are able to meet amy throughput at Savannah River.

That chart shows, therefore, that if we do not restart the Savannah River reactors in the near term—and we're talking within a year or so—we are going to wind up [deleted].

Senator McCLURE. May I ask a question here, Mr. Chairman?

Senator JOHNSTON. Yes.

Senator McCLURE There are two elements of reserve requirements, if I could put it that way, that have been recognized in the past. One is a margin of error, a margin of safety. The other is, simply, that you have to have a certain amount of material in the pipeline in order to push something in the front end and get something out the back. You are referring primarily in reserve now to the latter of those two.

PIPELINE INVENTORIES

Mr. STAROSTECKI. I am talking of the latter, just maintaining the pipeline.

Senator McCLURE We have, until this last year, talked about working reserve in terms of a margin of error or margin of risk.

Admiral Watkins has removed that from the computation; is that correct?

Mr. STAROSTECKI. We haven't removed it. We are going to be interested in developing a reserve above and beyond that which is needed for the pipeline. When we talk about a reserve [deleted] if something goes wrong, do we have something on the shelf——

Senator McCLURE. That's not reflected here

Mr. STAROSTECKI [continuing]. It's not reflected on here.

Senator McCLURE. But it has been reflected in charts we have had before

Mr. STAROSTECKI. I don't know that, Senator.

Senator McCLURE. Well, I will make that a statement, then, rather than a question.

Mr. STAROSTECKI. The intent of these charts is to show that we don't have that luxury at this time.

Senator McCLURE. All I wanted to do was to contrast this with what we have had before so that we understand what this means, as compared with what we have had before us before.

Mr. STAROSTECKI. Yes, sir; thank you.

As I indicate, the reactors would be restarted on a different cycle. They are going to be operating toward tritium production, and it is anticipated that they would operate for 13 months and then be shut down for 5 months to make modifications and upgrades. So we are factoring in conscious time to make upgrades to further improve the reactors and their reliability for the foreseeable future, until we can get a new production reactor on line.

[Chart deleted.]

WORKING INVENTORY

In talking about plutonium, the total plutonium inventory that we have, which consists of that which is in the stockpile, that to which some people refer as a working inventory, and what some people might say is available as metal on the shelf, and also that which is contained in scrap, what we see, with time, is that the blue lines show that the stockpile requires more plutonium with time. We are not manufacturing any more plutonium. So, the overall line starts decreasing, and the reason there is a negative slope for tailing off, we do lose some plutonium with waste. It's just not economically recoverable. So there is some finite amount that we will dispose of at will.

In order to meet the demands indicated on the blue hatched area, we will, in fact, be reducing the amount that we have in inventory and we will have to be relying on existing systems to process this scrap as a source of plutonium.

[Chart deleted.]

In order to understand the question of what does this mean in terms of plutonium reserve, it is think important to reflect on the fact that we are challenging the systems to recycle the scrap.

This chart is intended to show that assuming you have a working inventory—and I apologize for the reference case here; the reference case of zero means we have a quantity of plutonium in the pipeline sufficient to produce a product at Rocky Flats. What we have shown here is at the end of the fiscal year, the blue line shows how much we have so to speak in an additional reserve that we could put on the shelf. And, because of the statistics, we are not able to project month by month what happens beyond 2 years.

But, when we look at the working inventory of how much would we need to go in the next 2 years, we, in fact, with those lines going negative are saying that we are going to be challenging the people at Rocky Flats to work with smaller pipeline inventories, and, in fact, become more efficient.

Senator McClure. Can they?

Mr. Starostecki. Discussions with the Rocky Flats people say they can. These kinds of numbers—and we're talking on the order of [deleted]—they can manage. But when we start talking [deleted] they have a serious problem.

We did squeeze on the tritium pipeline, and it has provided us some tritium. We have not operated with [deleted] on tritium. We are similarly saying to what extent we squeeze on plutonium.

Senator McClure. Let me ask this, if I may.

If, indeed, they can do that, why isn't that an operational requirement routinely, rather than an emergency response?

PLUTONIUM INVENTORIES

Admiral Barr. Senator, I think it has a lot to do with the efficiency of the operation. If you get down below the zero line here in the plutonium, then you have scheduling problems, and you may be a little late in some areas. It just gets a lot harder to run the operation, and it gets harder and harder, until you get, as Mr. Starostecki said, down to about the [deleted] when things just start falling apart.

Senator McCLURE. Well, I do not mean to be argumentative, but I'm not sure that we want to say whether it is easy or hard if you can operate that way and it has not been presented to us before that you can operate it that way. As a matter of fact, you told us you can't operate it that way before. You had to have these volumes with which to operate. It's only when you run out of it that you then tell us "Oh, but we could find another way to do it."

If you can find another way to do it, why haven't you and why don't you? You say, "Because it is harder." Well, that does not impress me very much, if, indeed, it is only harder.

Admiral BARR. If you were to do that on a continuing basis, you would have trouble meeting schedules. Let me put it that way.

Senator McCLURE. Why is that, if it's hard? You people are used to doing hard things. You do them routinely. I remember Admiral Rickover telling me that repeatedly. I'm sure he told you that, too.

Admiral BARR. Sure.

Senator McCLURE. OK.

Now, assuming that Admiral Rickover is right, that you do the hard things routinely, you've told me this is only just harder. Then why don't you do it?

Admiral BARR. I do not have a good answer for you, Senator, because the situation has not been forced upon us.

Senator McCLURE. I am trying to press what it is that produces this suddenly found capability to do what you have never been capable of doing before.

Admiral BARR. To a certain degree I am sure it is necessity. I would not want to tell you that we could not work continuously at [deleted] and be successful. I think we know we can do it for a short time. Being able to do that for the long term may turn out to be more than just difficult—like the class is difficult in the short term. I would have to try to give you a better answer for the long term.

Senator McCLURE. Again, I am not trying to be argumentative. I am trying to press you to come up with the answers that we are going to be pressed to come up with in our conversations with our colleagues. If you can do it, then why not make you do it?

Admiral BARR. If you would allow us, we will get back to you for the record on that for the long term.

[The information follows:]

PLUTONIUM INVENTORY

The "O" line of the Plutonium Reserve chart represents the amount of working inventory necessary to support the particular build case under normal lead times and operating constraints. Normal lead times between Rocky Flats and the Pantex weapons assembly operations are necessary to meet consistently scheduled deliveries to the Department of Defense.

Within the working inventory pipeline are high purity plutonium parts and pieces which, when blended with slightly out of specification plutonium, make specification grade plutonium. However, when these high purity plutonium parts and pieces are used, only a small incremental amount of specification plutonium is created. This incremental amount of specification grade plutonium may permit Rocky Flats to maintain the adequate lead times to Pantex over a short period of time. This blending operation of high purity plutonium parts and pieces is useful as a short term solution to a specification grade plutonium shortage; however, once the blending is accomplished, no further high purity plutonium parts and pieces may be available for future blending. Even with the incremental inventory created by blending, it may be inadequate to meet normal lead times between Rocky Flats and Pantex. If the lead times between Rocky Flats and Pantex is shortened, there is an increasing risk that scheduled deliveries to the Department of Defense may not be met.

It is not a question of Rocky Flats working harder. The one-time blending operation will permit meeting production goals, but when the high purity plutonium is gone, so is the operational flexibility to meet future production goals.

MATERIALS PRODUCTION

Mr. STAROSTECKI. I think some of this has to do, also, with the types of mix that would, in fact, be produced and the scheduling of the various campaigns.

Senator McCLURE. So it would be a campaign in product mix?

Mr. STAROSTECKI. Yes; I believe that has a lot to do with it.

Senator McCLURE. You can do easier things during a period of stringency and wait for the lesser stringency time to do the harder things? Is that a fair way of saying it?

Mr. STAROSTECKI. I think that has a role here for the 3 or 4 months that we are talking about.

I think you are exactly right. The purpose of the chart, though, originally was to show how are we doing on a reserve above and beyond what we need for the pipeline. That is why we are getting into this very question. We have to start squeezing. Can we squeeze and how much? I think your question is a logical follow-on. If we have to squeeze this much, should we start doing this as a new way of doing business?

I think one of the outcomes of a lot of the upgrades to the Rocky Flats plant is a better procedure and the better conduct of operations. We all expect that would be one of the logical outcomes of the change.

Senator McCLURE. Obviously there are some offsets against doing this. There are offsets in efficiency, offsets in product mix, if I understand you, and perhaps offsets in cost. I don't know.

All I'm trying to probe is if, indeed, you can hit that negative and still operate, then why can't you operate anyhow? We need some answers to that because there are going to be some people who will say, "Hey, go ahead," so it makes it tough for you. After all, you signed on for tough duty.

Mr. STAROSTECKI. That is a question we are still pursuing because if you pursue that negative far enough, at some point somebody says, "Stop, we've run out of plutonium and can no longer manufacture it."

Senator McCLURE. That's what we need to know. What are the consequences if you are forced to operate that way.

Thank you.

Senator JOHNSTON. Sure.

Mr. STAROSTECKI. May I have the next chart, please.

[Chart deleted.]

HIGHLY ENRICHED URANIUM

Mr. STAROSTECKI. Again, this is a confusing chart to some extent, but what we are trying to show is what do we have in terms of available, highly enriched uranium at Oak Ridge, which is the reserve in blue, and what kind of demand, shown in red, do we anticipate.

We draw the conclusion that some time in fiscal year 1992 we are going to need new product. We are not asking for it in the 1991 budget. But the numbers would show that we do need to get more material.

Senator JOHNSTON. Why is that? What do you need the uranium for?

Mr. STAROSTECKI. [Deleted.] Quite frankly, we have highly enriched uranium available in weapons that have been returned, and they are sitting at Pantex. We need to transport them from Pantex back to Y-12 to recover the highly enriched uranium. Any additional arms control agreements might show that gee, you have all this highly enriched uranium coming back, so why don't we use that.

The problem that we are having is just getting the transportation issues resolved and the reprocessing capability resolved when you have all of that material at once.

Senator MCCLURE. Do you have the reprocessing facility to do that?

Mr. STAROSTECKI. Y-12 does that.

Senator MCCLURE. Does it have sufficient capacity?

Mr. STAROSTECKI. I don't have the capacity answer yet. The solution I think people have been looking to is let's purchase more in 1992.

Senator MCCLURE. Purchase from whom?

PORTSMOUTH GASEOUS DIFFUSION PLANT

Mr. STAROSTECKI. We pay the Office of Nuclear Energy to get the Portsmouth gaseous diffusion plant to supply the material for us. So we have to put an order in.

Senator MCCLURE. Highly enriched?

Mr. STAROSTECKI. Highly enriched.

Senator MCCLURE. From Portsmouth?

Mr. STAROSTECKI. We get highly enriched from Portsmouth. I think your question is a logical question. What if we get more weapons being returned from the stockpile? Can we transport them and are we limited with transportation? Are we limited in any way with reprocessing capacity, because that is a source of highly enriched uranium.

Senator MCCLURE. We are abandoning SIS because we don't need that source.

Mr. STAROSTECKI. Well, the SIS issue obviously is the impact on the budget. But when you saw the plutonium reserve requirements as you get out, the numbers at the end of the year look better.

Senator MCCLURE. On that than they do on the highly enriched uranium?

Mr. STAROSTECKI. Yes, sir.

What I am trying to say is, in simple-minded terms, one can say yes, we have enough highly enriched uranium. It is sitting at Pantex and in other warheads that have been returned. We are not yet sure that that is the case, and, even if we had it there, we need to look at the transportation and the reprocessing capability.

Dr. BARKER. Let me try this in a different way.

I believe that that curve reflects the fact that there is a [deleted] of highly enriched uranium, so that comparing retirements over the next several years with the builds, a net increase is expected. We don't retire as much highly enriched uranium as we are going to put out in new weapons. And, while it is unfair to blame a specific weapon system for that, the most significant new user of highly enriched uranium is the [deleted]. And so, that is the primary single-weapon system that contributes to the new requirement.

I think both you gentlemen will remember that, back in 1964, we had well in excess of, I guess, [deleted] of highly enriched uranium, which was associated with weapons. That total is now down [deleted]. And so, it is not surprising that as we have moved to more modern weapons, which are physically smaller, they have required some increase in uranium over the much larger and physically heavier weapons that we produced back in the 1950's and 1960's. So we are seeing a net requirement for about [deleted] of highly enriched uranium showing up in the next 4 to 5 years.

Mr. STAROSTECKI. And what is critical here is the product output from the gaseous diffusion plant at Portsmouth is a gas. We need uranium metal, and that conversion of UF-6 to UF-4 is going to be done at Oak Ridge, in a facility that was constructed several years ago, and we are now in the final throes of getting it ready to be operational.

We currently do not have a new, modern facility converting uranium to metal. What was done in 1964 lasted us, and we now have the facility. We are doing the final checkouts, and we hope to have it operational in the middle of next year. So, when the demand is there, we will be ready to convert it.

There is not a problem with Portsmouth providing a product once we give notice that it is needed. There is not a capacity problem there.

That is a brief overview. I would be pleased to answer any questions after Dr. Monetta's presentation.

[The statement follows:]

STATEMENT OF RICHARD W. STAROSTECKI

Mr. Chairman and Members of the Committee: I am Richard W. Starostecki, Deputy Assistant Secretary for Nuclear Materials, under the Assistant Secretary for Defense Programs of the U.S. Department of Energy (DOE). I appreciate this opportunity to provide testimony regarding the Department's Nuclear Materials Production program and its budget request for FY 1991.

The goals that form the basis of the FY 1991 budget request are those established by Secretary Watkins. Protecting the environment and ensuring the safety and health of workers and the public is our first priority and our greatest challenge. The nuclear materials complex must be operated to meet production requirements while achieving compatibility with our commitment to environment, safety and health programs.

THE STATE OF THE COMPLEX

This program mission is primarily accomplished through the operation of select facilities at five major sites: the Plutonium Uranium Extraction Plant (PUREX) and Plutonium Finishing Plant (PFP) facilities at Richland, Washington; the Feed Materials Production Center (FMPC) at Fernald, Ohio; the Idaho Chemical Processing Plant (ICPP) at the Idaho National Engineering Laboratory, Idaho Falls, Idaho; and numerous facilities at the Savannah River Site (SRS), Aiken, South Carolina. In addition, there are some important support functions performed at the Y-12 facility in Oak Ridge, Tennessee.

Most of the facilities in this complex are old and were built to the less stringent environmental and safety regulations of the 1950's and early 1960's. The complex has deteriorated through years of neglect and insufficient maintenance of plant and capital equipment and it is now viewed by many as a major threat to the environment and to safety and health. To meet near-term requirements, we are in the process of upgrading facilities and implementing new procedures at the SRS and at the ICPP to ensure maintenance of a safe, reliable, production capability. We are in a stage of transition. The highest priority is the restart of the Savannah River reactors to produce tritium. Plutonium is being obtained from the processing of scrap materials containing plutonium residues and the recycle of material from retired weapons.

THE MISSION

The Office of Nuclear Materials Production directs DOE's program to produce nuclear materials to meet national defense requirements. This mission will exist as long as the maintenance of a nuclear deterrent remains a keystone in the Nation's defense strategy. The principal nuclear materials required in support of the Nation's nuclear weapons arsenal are tritium, plutonium, and enriched uranium. Specific requirements for these materials are defined in the Nuclear Weapons Stockpile Memorandum (NWSM), updated and approved by the President annually. The requirements forecast in the stockpile memorandum are developed by the Department of Defense (DOD) in conjunction with DOE. In addition to providing nuclear materials for national defense, the Nuclear Materials Production program also produces and provides nuclear materials for use in Government research and development activities and in civilian research, commercial and medical applications. Spent fuels from the Navy's nuclear propulsion reactors and from research reactors are reprocessed, and the recovered uranium is recycled into DOE production reactors.

Historically, the Nuclear Materials Production program has been responsible for the production of new or virgin nuclear materials in N Reactor at Hanford, Washington and the Savannah River reactors in Aiken, South Carolina. The recycle of material and residues from retired weapons and the weapons manufacturing process was historically the responsibility of the Office of Military Application. However, in the mid-to-late 1980's, as plutonium residues from weapons production and recycle activities accumulated at the Rocky Flats Plant (RFP), excess capacity in Nuclear Materials Production facilities at SRS and Hanford was utilized to assist in reprocessing these materials. Also, reduced requirements for plutonium permitted the shutdown of N Reactor which had been producing weapon-grade plutonium. Current plutonium requirements can now be met totally through recycle of material from retired weapons and recovery from accumulated residues; therefore, no reactor production of plutonium has been planned for the foreseeable future. Consequently, the ability to meet the plutonium requirements is highly dependent on the operation of the RFP which is responsible for the majority of weapons recycle and residue processing activities.

The Nuclear Material Production plutonium facilities are now in a period of transition from supporting reactor plutonium production to supplementing the RFP weapons recycle and residue processing functions which are of insufficient capacity to meet currently identified needs. This transition involves phasing out plutonium processing at Hanford as existing materials on site are processed and adaptation of existing facilities at SRS to permit recycle of retired weapon materials and enhanced recovery of plutonium residues from the RFP. With cessation of virgin plutonium production and complete reliance on recycle and residue recovery, the Office of Nuclear Materials' role in plutonium supply, though essential, has diminished relative to that of the Office of Military Application and its RFP.

ENVIRONMENT, SAFETY AND HEALTH

As announced by the Secretary last June, the Department is aggressively pursuing a Ten-Point Plan intended to bring our facilities into full accountability and compliance with environmental, safety and health requirements.

Part of the Ten-Point Plan is the performance of independent "tiger team" reviews to be conducted at all Defense Programs' sites. The reviews of the FMPC and the non-reactor facilities at the SRS have already been completed. The "tiger team" review at the FMPC, conducted during July and August 1989, found that that facility was not in full compliance with environmental regulations, had not kept pace with changing safety and health requirements, and had insufficient capability to ensure timely compliance with environmental, safety and health requirements. We have prepared an action plan to address all the "tiger team" findings for the FMPC. Our technical response and the implementation plan, containing detailed schedule data and resource requirements, is being reviewed by other departmental elements before being submitted to the Secretary for approval. Some corrective actions have already been completed, some are well underway, and some will take several years to complete. The recent review at the SRS consisted of a combination of three technical safety appraisals as well as the "tiger team" review itself. This review did not assess the reactors which are subject to ongoing reviews during the restart effort. The selected facilities sampled included the waste management, tritium, laboratory, and support facilities. The reviews identified a number of findings in the environmental, safety, health, management, and organization areas where improvements are needed, however, no conditions were found which warranted interruption of current operations. Development of an action plan to address all the findings is underway.

Another Ten-Point Plan initiative is the establishment by the Secretary of a new management team in Defense Programs. In that vein, and as reflected in the planned reorganization of the Office of the Assistant Secretary for Defense Programs, we are establishing a permanent technical staff of various disciplines. This staff will support line management in carrying out its responsibility to assess the adequacy of operations, existing designs and management control systems across the Defense Programs complex, not just at Nuclear Materials Production facilities. In this regard, line managers will have the capability to develop technical guidelines which satisfy existing and emerging DOE Orders, as well as to assure uniformity in providing consistent technical guides to our operation office managers who monitor the onsite activities on a day-to-day basis.

At this time I will proceed to discuss the details of our programs, covering current issues as well as the funding requested in the budget you have before you.

MATERIALS REQUIREMENTS

Tritium

The tritium in the weapons stockpile decays at the rate of about 5.5 percent per year. In order to maintain the effectiveness of the stockpile, the tritium components are exchanged and recycled. In addition to this recycle work, the new weapons which replace retired weapons in the stockpile require tritium.

The SRS reactors are the Nation's sole source for production of tritium to meet the military needs of the DOD and the other government and civilian requirements. These reactors have not operated since April 1988 and therefore the demand for tritium is currently being met with existing inventories and DOD returns.

The attached chart shows the available tritium reserves from the beginning of October 1989 and as currently projected through September 1994. The chart shows the net available tritium on hand at SRS after satisfying the needs of the NWSM. The solid horizontal line labeled "minimum" represents the estimated minimum amount of pipeline inventory required to operate the tritium processing facilities. The complex has historically operated with a larger working inventory. The remaining two lines on this chart show the expected available tritium reserves under reactor scenarios of 1) no restart, and 2) a phased restart of the three reactors at three month intervals starting in October 1990, with subsequent operation at 50 percent of full power level. Each of these scenarios reflect requirements as projected in the

[DELETED]

Plutonium

This next chart shows the available plutonium reserves after satisfying the stockpile requirements. Much of the plutonium required for building new warheads is obtained by recovery and recycle of materials from retired weapons returned by the DOD to the DOE. The remaining plutonium demand, excluding the reserve, can be met by processing the previously produced weapon-grade plutonium, blending previously produced fuel-grade plutonium with existing inventories of high-purity plutonium, and recovery of plutonium from the backlog of nonspecification weapon-grade plutonium.

The projections in this chart are used as a management tool to focus attention on understanding why the curve is this shape. A further review of the situation reinforces the fact that plutonium demand and supply are highly dependent on resumption of operations at the RFP. Although the chart shows an increase in the available weapon-grade plutonium in later years, it demonstrates in the near term that even with a sufficient reserve of plutonium we are very dependent on our processing capacity to get it into the proper form for fabrication. This presumes DOE is capable of processing the scrap inventory to meet the chemical and isotopic specifications required for use in weapons and concurrently reducing the working inventories.

Enriched Uranium

I also need to mention the supply of highly enriched uranium for U.S. weapons. The U.S. weapons program has operated within its existing inventory of enriched uranium for the last 26 years without having to obtain additional material from the uranium enrichment complex. This has been accomplished by recovery and recycle of enriched uranium from retired warheads and using existing inventories.

[DELETED]

FY 1991 BUDGET OVERVIEW

For FY 1991, the total budget request for Nuclear Materials Production is $2.413 billion. This represents a 15 percent increase over the FY 1990 appropriation.

After inflation, SRS increases by $338.3 million. Funding for the Reactor Operations Management Plan, the reactor restart program, increases by about $150 million. Also, about $110 million in additional funding will be directed to necessary operational improvements to nonreactor facilities at the SRS. Finally, approximately $80 million will be required to maintain existing or new environmental, safety and health projects at SRS. Total funding requirements at other Nuclear Materials Production sites have decreased slightly from FY 1990 to FY 1991. I will now discuss the highlights of our funding requests at each of our major sites.

HANFORD

Funding for Hanford operations drops by about $10 million from the FY 1990 funding level to $219.9 million in FY 1991.

Efforts to place the N Reactor at Hanford in dry layup resumed in October 1989 and are expected to be completed by the end of FY 1990. Maintaining the N Reactor in a safe dry layup condition will cost about $40 million in FY 1991.

The PUREX Plant completed limited operations in March to clean out the facility in preparation for an extended plant outage. During the subsequent planned outage, provisions will be made to meet environmental compliance regulations for the discharge of liquid effluent. Future operation is contingent on completion of these upgrades. Our budget request assumes PUREX restart in December 1990 to conduct the processing of existing stockpiles of N Reactor irradiated spent fuel. A small portion of this stockpile is weapon-grade material and could be recovered in about 6 months of PUREX operation.

We are currently studying options for the processing of the remaining fuel grade N Reactor spent fuel as well as other spent nuclear fuels on the Hanford site. We are also reviewing an environmental analysis of planned PUREX Plant operations to document changes in the environmental baseline, if any, established in the PUREX Environmental Impact Statement which was issued in 1983. Should this analysis identify deficiencies in the existing environmental documentation, we will initiate actions to assure full compliance with the requirements of the National Environmental Policy Act (NEPA).

The recovery and metal production facilities at the PFP at Hanford provide a capacity to recover plutonium from scrap and other process materials for conversion to plutonium metal. Approximately [DELETED] of weapon-grade plutonium can be recovered at PFP on an annual basis. Although this is a limited capacity compared to capabilities at RFP and SRS, it does represent a capability we expect to maintain into the mid-1990's. In addition, the PFP facilities support site cleanup activities.

IDAHO CHEMICAL PROCESSING PLANT

Funding at the ICPP remains relatively constant, decreasing only from $228.2 million in FY 1990 to $226.2 million in FY 1991. This facility recovers useable uranium through reprocessing of spent fuel from the Navy's nuclear propulsion reactors. Subsequently, the recovered material is shipped for further processing at the Oak Ridge Y-12 facility and fabrication into fuel elements at SRS.

The modernization of the plant began with construction of the Fluorinel Dissolution and Fuel Storage Facility, which was initiated in the late 1970's. That facility replaced old, outdated, fuel storage capabilities and provided needed improvements to fuel dissolution capabilities.

Two major projects are currently underway and are continued through the FY 1991 budget: the Fuel Processing Restoration (FPR) and the Fire Protection Upgrade projects.

The ICPP was designed and built in the early 1950's to demonstrate fuel processing technologies and to support DOE's Nuclear Materials Production program. Over the plant's operating years, many modifications and additions have been made to provide a facility capable of safely meeting DOE's fuel receipt, handling, storage, and disposal requirements, was well as DOE's fuel processing needs. The FPR project will replace the last facility that was part of the original ICPP complex.

The FPR project will replace the originally installed uranium purification system with new modern facilities, thereby increasing reliability and enhancing the safety of these operations. The benefits to be achieved by completing this project are considerable: improvement of personnel safety by reducing radiation exposure, reduction of radioactive waste generation, compliance with today's more rigorous environmental protection standards, reduction of environmental discharges through recycle of process water and enhancement of criticality safety.

To correct the problems and conditions identified, the FPR project, with state-of-the-art engineering, would provide systems, facilities, and features that meet today's codes, standards, and requirement. Implementation of the FPR project is expected to yield significant savings in several areas, including: a reduction in personnel radiation exposures; a reduction in major plant shutdowns; a reduction in the volume of contaminated liquid wastes generated; and a substantial decrease in minor miscellaneous contamination incidents per year. The most recent ICPP average annual fuel receiving forecasts indicate ICPP's operating mission extending to at least the year 2028. The FPR project provides the necessary operating continuity and process reliability to ensure that the ICPP meets its improvement objectives and its defined operating mission.

A second project of significance is the Fire Protection Upgrade project. The improvements provided by this project are necessary to bring the ICPP into compliance with the DOE's fire protection orders and nationally recognized codes and standards. The scope of the project is based on the findings of a recently completed, independent evaluation of the plant's fire and life safety systems.

Y-12

The Y-12 Site at Oak Ridge plays a vital role in the Nuclear Materials Production program. Y-12 receives the ICPP enriched uranium oxide product and the enriched uranium oxide recovered from SRS reactor spent driver fuel. Y-12 then purifies and blends the material to the proper enrichment, converts the material to metal, and ships it to SRS for use in fabricating new driver fuel.

Currently, highly enriched uranium metal for weapons and other applications is provided from the DOE stockpile; however, replenishment of the stockpile is expected to be required in [DELETED]. Reestablishment of the capability to convert highly enriched uranium hexafluoride to uranium tetrafluoride, a key step in the production of metal from the product of the Portsmouth Gaseous Diffusion Enrichment Facility, is required to provide an adequate supply of metal. The operation of the new Enriched Uranium Conversion Facility at Y-12 will fulfill this function.

FEED MATERIALS PRODUCTION CENTER

Funding for the FMPC drops $34 million to a total of $90.6 million in FY 1991. This is principally due to the curtailment of planned construction projects, consistent with our intent to shut down the FMPC's depleted uranium production facilities.

Slightly enriched uranium operations were halted at FMPC with the standdown of the Hanford N Reactor. Our objective is to phase out depleted uranium production operations at the FMPC in favor of procurement from the private sector. Depleted uranium production has been suspended since July 1989 to concentrate contractor efforts on safety improvements and site cleanup. Due to the suspension of operations at the FMPC, it has been necessary to accelerate the program of qualification of commercial depleted uranium sources. Depleted uranium production facilities will be maintained in standby at the FMPC pending the success of the vendor qualification program. We expect to finish the qualification process and issue a purchase order for delivery of depleted uranium in September 1990. About $12 million of the FMPC FY 1991 budget request is planned for delivery of depleted uranium purchases from qualified vendors beginning in October 1990.

Compliance with environmental, safety and health requirements is our primary current effort at Fernald. A Federal Facility Compliance Agreement is currently being renegotiated with the U.S. Environmental Protection Agency to establish milestones to bring the FMPC into compliance with environmental regulations. A consent decree is also being amended with the Ohio Environmental Protection Agency. The Sitewide Draft Environmental Impact Statement for Renovation and Site Evaluation is complete and is scheduled to be published shortly.

The Department is currently developing a strategy leading to phasing out the nuclear material production activities at the FMPC including plans for ensuring ultimate disposition of the materials currently onsite, achieving and maintaining compliance with regulatory requirements, and transition to remedial actions and decontamination and decommissioning activities.

SAVANNAH RIVER SITE

Funding for the SRS constitutes approximately 65 percent of the budget request for Nuclear Materials Production. A $383.7 million increase, equivalent to 32 percent, from FY 1990 to FY 1991 is needed to continue the activities initiated in FY 1989 and FY 1990.

The Secretary remains committed to resuming, as soon as possible, the safe production of tritium at SRS. Safe reliable tritium production at SRS is critical to the success of our production mission. In support of supplying tritium, funding is needed for reactor restart as well as for nonreactor facility improvements. Additionally, the SRS provides support to the DOD, National Aeronautics and Space Administration (NASA), and DOE through the manufacture, processing, and packaging of radioactive materials which are used as heat sources for generating electricity. Our primary focus at SRS is upgrading human performance and the management control systems. These areas were the underlying reasons for the deficiencies that resulted in the reactor shutdowns in 1988 and contributed to the deterioration in the equipment.

REACTOR RESTART

Since August of 1988, the production reactors at SRS have been in an extended outage during which safety concerns are being addressed. Four principle areas have been identified for improvement: design bases and system performance; human performance; management systems and practices; and DOE onsite technical vigilance and oversight.

Current planning is based on restart of the K Reactor during the fourth quarter of FY 1990 followed by the L and P Reactors respectively at 3-month intervals. There does remain some uncertainty in those plans making it impractical to announce a specific restart date. For example, environmental constraints such as the seasonal performance of the cooling lake for L Reactor are factors which impact the order in which the reactors are started up. The Secretary of Energy is currently reviewing the progress of the improvements and the other factors impacting restart and the specific dates and sequence for restart are expected to be announced soon.

DOE's objective is to assure that the reactors can produce nuclear materials safely, reliably, and in a manner that protects the environment. Major improvements that will be made prior to the restart of any SRS reactor include: establishment of reactor power limits that assure that the capabilities of the Emergency Core Cooling Systems will not be exceeded in the event of a design basis Loss of Coolant Accident; verification of and improvements to the strength and integrity of the primary coolant system (including the reactor vessel); and considerably expanded training and knowledge requirements for reactor operations personnel.

To allow for public participation in the restart process and to further the purposes of the NEPA, DOE is preparing an Environmental Impact Statement evaluating the environmental impacts of continued operation of the reactors prior to any decision to restart the reactors.

To assure that the SRS reactors are ready to restart, DOE is conducting a safety evaluation, and we will issue a Safety Evaluation Report that documents the basis for DOE's evaluation.

NONREACTOR FACILITIES

A number of the SRS nonreactor facilities and operations are critical to the tritium production mission. They include: operation of fuel and target fabrication facilities, completion and operation of the Uranium Solidification Facility, operation of H canyon and the tritium extraction plant, and operations and upgrade of the power plant. Many of these SRS facilities are over 30 years old, designed and built to outdated environmental and safety standards. Production priorities in addition to funding constraints have often forced deferral of necessary expenditures for preventive maintenance,

operational improvements, operator training, enhanced technical support, and improved incident analysis systems. The Department has begun to correct these known deficiencies. Priority for tritium in a resource limited environment requires that a slower pace be taken for improvements at the nonreactor facilities than for the reactors. Improvements in the human performance and conduct of operation areas are being implemented in a timely manner.
Reviews by the National Academy of Sciences of the reactors at the SRS were conducted in 1986 and 1987, and additional reviews by the Advisory Committee for Nuclear Facility Safety (Ahearne panel) revealed safety and health deficiencies that are now being corrected. During 1989, the National Academy of Sciences reviewed the nonreactor facilities at the SRS. As expected, their review of nonreactor facilities revealed similar health and safety deficiencies that are similarly being corrected.

The SRS has developed a preliminary nonreactor facility improvement plan. The scope includes: (1) development of an enhanced training program for nonreactor facility operators (fuel and target fabrication; plutonium, uranium, and tritium processing plants; power plants; and other supporting facilities); (2) initiation of an operational improvement program to enhance performance at all nonreactor facilities, including radiological protection, safety analysis review upgrades, safety appraisal development and physical security improvements; and (3) increased environmental, safety, health and quality assurance activities related to performance guidelines, human performance, management systems, and facility improvements. We have reviewed the plan, identified some gaps and met with the contractor to ensure a full understanding of the needed corrective action. We view the plan as dynamic, most of the preliminary elements are needed and as further reviews are completed additional elements will be identified. For example, the need to promote line management accountability at each individual facility is still being addressed. Similarly, an integrated approach to operational safety should include the responsibility for radiation safety and protection at the level of plant manager. The contractor recognizes these gaps in the current plan and is preparing to supplement it.

NUCLEAR MATERIALS FOR NON-WEAPON USE

Radioisotope Thermoelectric generators (RTGs) produce electricity from heat through the application of radioactive materials. The RTGs are the enabling technology for a wide range of NASA deep space and planetary exploration missions, and for DOE national security missions. A form of plutonium referred to as plutonium-238 is the optimum fuel for powering RTGs. Plutonium-238 requirements have been identified by the Department, the Navy, and NASA. For the near-term, the Department plans to rely on the current inventory of plutonium-238 at the SRS. This inventory will be blended at the SRS to meet user specifications so as to extend the supply as long as possible. For the long-term, production of new plutonium-238 in the SRS production reactors is required to meet the needs of current firm missions. Activities that must be completed include: completion of a plutonium-238 blend program to recover available material; production of neptunium-237 in HB-line; fabrication of neptunium-237 into reactor targets; reactor irradiation; and processing in H canyon, HB-line and the Plutonium Fuel Form Fabrication facility.

SPECIAL ISOTOPE SEPARATION

Current budget constraints have forced the Department to reevaluate its decision to proceed with the construction of the SIS facility in Idaho. Accordingly, the Department has not requested construction funding in FY 1991. Phaseout of the construction project is proposed to begin on April 1, 1990 and be completed during FY 1990. The decision by the Department not to construct the SIS facility at this time is based on a reassessment of the Department's priorities in order to conform to the budget constraints imposed by the FY 1991 and anticipated future budgets.

The SIS facility would have provided the Department with an additional source of weapon-grade plutonium as a contingency to meet any future identified needs for this material. In order to preserve a viable option for future deployment of this contingency, the Department proposes to complete the development of the SIS technology at the Lawrence Livermore National Laboratory in California. This plan calls for the use of nonhazardous surrogate materials in the Engineering Demonstration Facility, in lieu of plutonium. These tests will resume subject to completion of appropriate NEPA requirements.

This research and development effort is scheduled to conclude in FY 1991 and will require $66 million in FY 1991. The Department anticipates no additional program funding beyond FY 1991 and a maximum of $25 million in potential deferred outyear closeout costs.

The Administration is proposing an expedited, but orderly, closeout of the SIS Production Facility Project (86-D-148), which had been slated for construction in Idaho. We are requesting no construction funds for FY 1991 and will commence closeout activities as soon as Congress approves the necessary reprogramming of SIS funds as part of the Department's Omnibus FY 1990 reprogramming action. We anticipate being able to save $14.4 million from FY 1990 project funding, presuming closeout of this project is approved by April 1, 1990.

The Secretary has recognized that there are potential alternate applications for the Atomic Vapor Laser Isotope Separation (AVLIS) technology beyond those being developed by DOE and has initiated a study by the National Academy of Science to identify the most promising of these. Potential alternate applications include such areas as: reduction or minimization of nuclear waste, improving the purity and quality of materials for the electronics industry, laser and optics technology applied to various communications and electronics applications, etc. The potential spinoffs of DOE development of the AVLIS process could have ramifications in the modernization of commercial industry and in the accomplishment of future defense missions.

By bringing the research and development program in an orderly and logical conclusion as proposed, the Department will be positioned to promptly deploy this capability should that need arise in the future. This course of action should provide a sufficient technology base. Continued SIS research and development will also place the Department in a better position to study the alternate applications of this technology and to transfer elements of the technology to users throughout the defense complex and possibly to the private sector as well.

MAINTENANCE

I have just outlined the major activities we are undertaking through FY 1991. These activities represent a comprehensive program to bring existing facilities in line with current environmental, safety and health regulations and expectations. Once upgrade actions are accomplished, we face the challenge of maintaining our facilities to established standards and responding to changes to these standards in a timely manner. Although there are many factors important to meeting this challenge, maintenance is critical to our success. As I have mentioned before, the Department has neglected its maintenance program. This is not unlike the situation that existed in the commercial sector prior to the accident at Three Mile Island. It is always easy in times of fiscal constraint to espouse the concept "don't fix it till it breaks". We must strongly support future funding for maintenance and not allow fiscal pressures to undermine all we have and will accomplish.

Effective maintenance programs will be developed and implemented for all facilities in the nuclear materials complex, not just the reactors. These programs will be built on a thorough knowledge of facility designs, a comprehensive understanding of why the particular characteristics of each design were chosen, and the careful review of the analyses and testing employed to demonstrate compliance with those design requirements. This body of engineering data will provide the basis for establishment of safe operating limits, as well as the underpinning for preventive and predictive maintenance programs to assure the preservation of adequate safety margins throughout remaining plant lifetime. Surveillance testing as an integral part of the maintenance programs will monitor actual performance of structures, systems, and components. Comparison of actual to required performance will be utilized to identify remaining margins and provide early warning of potential infringement upon safe operating limits.

PROGRAM OVERSIGHT

One of the most serious management issues facing the Department is the lack of sufficiently qualified and trained technical personnel who have a firm underpinning in the areas of environment, safety and health--the very people needed to make the system work. For the career federal employee, there does not currently exist within DOE, a professional career development program that teaches, trains, and develops personnel for the highly important and increasingly complicated task of managing environment, safety, health and production at facilities as varied and complicated as those in the nuclear weapons complex. In a world in which "you get what you pay for," there are many obstacles (noncompetitive salaries, constraining conflict-of-interest laws, etc.) impeding the Department from attracting, training, and retaining adequate numbers of able managers. There continues to be a problem of recruiting highly competent technical personnel with the necessary experience; to help overcome this problem in the future, an aggressive recruiting and training program oriented toward recent college graduates is planned.

SUMMARY

Our commitment to environmentally sound and safe operations is unshakable. Public confidence in our ability to conduct environmentally acceptable and safe operations to achieve our production mission must be based on demonstrated performance. To this end we are working toward a program of full compliance with the Secretary's initiatives regarding NEPA and nuclear safety. In order to be true to this commitment and still accomplish our mission of supplying nuclear materials for defense and other purposes, our FY 1991 budget requirements, as shown on this final chart, are essential.

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

HANFORD OPERATIONS

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES	$ 235.0	$ 209.8	$ 199.9
CAPITAL EQUIPMENT	13.7	12.7	9.3
CONSTRUCTION			
GENERAL PLANT PROJECTS	5.9	4.2	4.4
90-D-143 PFP FIRE SAFETY	0	.8	2.5
86-D-149 PROD. RETENTION	0	2.1	3.8
TOTAL CONSTRUCTION	5.9	7.1	10.7
TOTAL	$ 254.6	$ 229.6	$ 219.9

N REACTOR

O DRY LAYUP WILL BE COMPLETED BY END OF FY 1990

PUREX

O EXTENDED PLANT OUTAGE PLANNED AFTER COMPLETION OF CURRENT CAMPAIGN IN MID-MARCH

O DURING OUTAGE ENVIRONMENTAL UPGRADES TO HANDLE EFFLUENT STREAMS FROM THE PLANT AND THE 242-A EVAPORATOR WILL BE PERFORMED

O OPERATIONS ARE EXPECTED TO RESUME IN DECEMBER 1990

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

IDAHO CHEMICAL PROCESSING PLANT

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES	$ 99.0	$ 105.3	$ 119.2
CAPITAL EQUIPMENT	7.0	8.5	8.0
CONSTRUCTION			
GENERAL PLANT PROJECTS	3.8	7.2	5.5
90-D-141 FIRE PROTECTION UPGRADE	0	3.5	6.0
86-D-148 SIS PROD. PLANT	17.0	29.8	0
85-D-139 FUEL PROCESSING RESTORATION	50.1	73.9	87.5
TOTAL CONSTRUCTION	70.9	114.4	99.0
TOTAL	$ 176.9	$ 228.2	$ 226.2

O MODERNIZATION OF ICPP BEGAN WITH CONSTRUCTION OF FAST FACILITY

O TWO MAJOR PROJECTS ARE UNDERWAY

O FUEL PROCESSING RESTORATION

- IMPROVES PERSONNEL SAFETY BY REDUCING RADIATION EXPOSURE
- REDUCES RADIOACTIVE WASTE GENERATION
- REPLACES AGING PLANT WITH NEW MODERN FACILITY INCREASING RELIABILITY
- COMPLIES WITH TODAY'S MORE RIGOROUS ENVIRONMENTAL PROTECTION STANDARDS
- REDUCES ENVIRONMENTAL DISCHARGES THROUGH RECYCLE OF PROCESS WATER
- PROVIDES ENHANCEMENTS TO CRITICALITY SAFETY
- CONSTRUCTION IS ON-GOING

O ICPP FIRE PROTECTION

- CORRECTS LIFE SAFETY AND FIRE PROTECTION DEFICIENCIES IDENTIFIED BY INDEPENDENT STUDIES
- DESIGN INITIATED

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

Y-12

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES	$ 13.3	$ 16.8	$ 14.5
CAPITAL EQUIPMENT	1.7	2.2	3.1
CONSTRUCTION GENERAL PLANT PROJECTS	0	0	2.1
TOTAL	$ 15.0	$ 19.0	$ 19.7

O PROVIDES THE HIGH ENRICHED URANIUM METAL ~~FOR~~ SAVANNAH RIVER SITE (SRS)

- PROCESSES AND RECYCLES URANIUM PRODUCT FROM IDAHO CHEMICAL PROCESSING PLANT AND SRS FOR USE AS FUEL IN REACTORS
- PROVIDES FOR STARTUP AND OPERATION OF ENRICHED URANIUM CONVERSION FACILITY
- PROVIDES PROJECT SUPPORT FOR SRS EFFORTS TO CONVERT URANYL NITRATE TO OXIDE FOR SAFETY CONCERNS

O PROCESSES DOE GENERATED URANIUM SCRAP AS THE DESIGNATED CENTRAL SCRAP MANAGEMENT OFFICE

O SUPPORTS QUALIFICATION OF COMMERCIAL VENDOR TO FABRICATE DEPLETED URANIUM METAL FOR WEAPONS PROGRAM

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

FEED MATERIALS PRODUCTION CENTER (FMPC)

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES	$ 67.5	$ 53.8	$ 70.1
CAPITAL EQUIPMENT	8.8	8.0	5.2
CONSTRUCTION			
GENERAL PLANT PROJECTS	4.0	1.2	0.2
86-D-149 PRODUCTIVITY RETENTION	31.2	21.2	1.0
87-D-159 FMPC ENVIRONMENTAL PROJECT	49.9	40.4	14.1
TOTAL CONSTRUCTION	$ 85.1	$ 62.8	$ 15.3
TOTAL FMPC	$ 161.4	$ 124.6	$ 90.6

- PRODUCTION HAS BEEN SUSPENDED TO CONCENTRATE ON CLEANUP AND WASTE MANAGEMENT
- TIGER TEAM REVIEW COMPLETED 8/89
  - IMPLEMENTATION PLAN RECEIVED 2/90
- VENDOR QUALIFICATION FOR DU UNDERWAY
  - NEAR-TERM SOURCE MAY BE AVAILABLE BY SEPTEMBER 1990
  - SR DIRECTED TO DEVELOP PLANS FOR REACTOR PU TARGET SOURCE
- EVEN WITH PLANS TO CEASE PRODUCTION, FUNDING FOR CLOSEOUT IS REQUIRED FOR FORESEEABLE FUTURE

FY 1991 CONGRESSIONAL BUDGET REQUEST

SAVANNAH RIVER SITE (SRS) - MISSION

- TRITIUM PRODUCTION IS HIGHEST PRIORITY OF SRS
- REACTOR RESTART WILL CONTINUE BASED ON REACTOR OPERATIONS MANAGEMENT PLAN
- NONREACTOR FACILITY IMPROVEMENTS WILL BE FOCUSED TO SUPPORT REACTOR FACILITIES
- SRS WILL SUPPORT REQUIREMENTS FOR PU-238 FOR IMMEDIATE FUTURE
- FOCUS WILL BE ON UPGRADING HUMAN PERFORMANCE AND MANAGEMENT CONTROL SYSTEMS
- SAFETY UPGRADES ARE REQUIRED FOR ALL THREE SAVANNAH RIVER REACTORS
- FOUR PRINCIPAL AREAS OF IMPROVEMENT IDENTIFIED:
    - DESIGN BASES AND SYSTEMS PERFORMANCE
    - HUMAN PERFORMANCE
    - MANAGEMENT SYSTEMS AND PRACTICES
    - DOE ONSITE TECHNICAL VIGILANCE
- FOCUS IS ON ASSURING SAFETY, RELIABILITY, AND PROTECTION OF THE ENVIRONMENT

FY 1991 CONGRESSIONAL BUDGET REQUEST

REACTOR RESTART

- TENTATIVE SCHEDULE FOR RESTART
  - K REACTOR - 4TH QUARTER, CY 1990
  - L REACTOR - 1ST QUARTER, CY 1991
  - P REACTOR - 2ND QUARTER, CY 1991
- EXPECT TO FINALIZE STARTUP DATES APRIL 1990
- INCLUDES ALL ACTIVITIES REQUIRED TO ASSURE THAT K, L, AND P REACTORS AT SAVANNAH RIVER:
  - CAN RESTART IN A TIMELY MANNER
  - CAN CONTINUE TO OPERATE IN AN ENVIRONMENTALLY ACCEPTABLE, SAFE, AND RELIABLE MANNER
  - CAN PRODUCE NUCLEAR MATERIALS SPECIFIED IN THE NUCLEAR WEAPONS STOCKPILE MEMORANDUM (NWSM)

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

SAVANNAH RIVER SITE

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES			
NMP	$ 499.2	$ 498.1	$ 629.2
REACTOR OPERATIONS MANAGEMENT PLAN	358.6	499.1	652.6
TOTAL OPERATING EXPENSES	857.8	997.2	1,281.8
CAPITAL EQUIPMENT	62.2	66.0	77.8
CONSTRUCTION			
GENERAL PLANT PROJECTS	15.0	16.7	24.5
90-D-150 REACTOR SAFETY ASSURANCE	0	12.5	32.6
90-D-149 PLANTWIDE FIRE PROTECTION	0	4.8	49.1
86-D-149 PRODUCTIVITY RETENTION	43.5	57.3	57.0
ALL OTHER	61.2	39.5	54.9
TOTAL CONSTRUCTION	119.7	130.8	218.1
TOTAL SAVANNAH RIVER SITE	$1,039.7	$1,194.0	$1,577.7

IMPROVEMENTS TO NONREACTOR OPERATIONS ARE
CRITICAL TO OUR ABILITY TO PROVIDE MATERIAL

- FACILITIES ARE REQUIRED IN ADDITION TO REACTORS
  - FUEL AND TARGET FABRICATION FACILITY OPERATION
  - COMPLETION AND OPERATION OF FUEL PRODUCTION FACILITY
  - H CANYON EFFLUENT TREATMENT FACILITY OPERATION (EM FUNDED)
  - HIGH LEVEL WASTE TANKS AND EVAPORATORS (EM FUNDED)
- MAJOR ELEMENTS OF NONREACTOR IMPROVEMENTS PLAN
  - PERFORMANCE GUIDELINES
  - HUMAN PERFORMANCE
  - MANAGEMENT SYSTEMS
  - TRAINING
  - FACILITY IMPROVEMENTS

FY 1991 CONGRESSIONAL BUDGET REQUEST

SAVANNAH RIVER SITE - PU-238 PRODUCTION

- PU-238 REQUIREMENTS HAVE BEEN IDENTIFIED FOR NAVY, NASA, AND THE DOE
- THE DEPARTMENT RECENTLY MADE A DECISION TO PRODUCE THIS MATERIAL AT THE SRS
- ACTIVITIES WHICH MUST BE COMPLETED AT SRS INCLUDE:
  - COMPLETION OF PU-238 BLEND PROGRAM TO RECOVER AVAILABLE MATERIAL
  - PRODUCTION OF NP-237 IN HB LINE
  - FABRICATION OF NP-237 INTO REACTOR TARGETS
  - REACTOR IRRADIATION
  - PROCESSING IN H CANYON, HB-LINE AND PUFF

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

SPECIAL ISOTOPE SEPARATION

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES	$ 78.0	$ 75.4	$ 66.5
CAPITAL EQUIPMENT	0.4	2.4	0
GPP	0.6	1.8	0
CONSTRUCTION	23.0	39.4	0
TOTAL	$ 102.0	$ 119.0	$ 66.5

O FY 1989 - EIS RECORD OF DECISION, INTEGRATED TEST RUNS WITH SURROGATE MATERIALS IN ENGINEERING DEMONSTRATION FACILITY (EDS) AT LAWRENCE LIVERMORE NATIONAL LABORATORY

O FY 1990 - CONSTRUCTION PROJECT (86-D-148) CLOSEOUT, ENVIRONMENTAL ASSESSMENT (EA) FOR RESUMPTION OF SURROGATE TESTS IN EDS, INITIATE INDEPENDENT STUDY OF ALTERNATE APPLICATIONS OF AVLIS TECHNOLOGY BY NATIONAL ACADEMY OF SCIENCES

O FY 1991 - COMPLETE SURROGATE TESTING IN EDS, CONCLUDE AND DOCUMENT DEVELOPMENT PROGRAM, COMPLETE INDEPENDENT STUDY OF ALTERNATE APPLICATIONS OF AVLIS TECHNOLOGY

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
NUCLEAR MATERIALS PRODUCTION	$1,942.7	$2,092.3 A/	$2,413.0
		+8%	+15%

A/ REFLECTS $135 MILLION APPROPRIATION TRANSFER FROM THE DEPARTMENT OF DEFENSE, PURSUANT TO THE NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEARS 1990-1991, P.L. 101-189.

CHANGES FROM FY 1990 APPROPRIATION
($ IN MILLIONS)

FY 1990 APPROPRIATION	$2,092.3
O INFLATION	+75.4
O SAVANNAH RIVER	+338.3
O SPECIAL ISOTOPE SEPARATION	-55.9
O ALL OTHER ACTIVITIES	-37.1
TOTAL FY 1991 REQUEST	$2,413.0

FY 1991 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

	FY 1989 ACTUAL	FY 1990 APPROP.	FY 1991 REQUEST
OPERATING EXPENSES:			
REACTOR OPERATIONS	$ 620.0	$ 686.1	$ 811.5
PROCESSING	399.6	467.9	562.5
SPECIAL ISOTOPE SEPARATION	78.0	75.4	66.5
SUPPORTING SERVICES	258.0	232.7	302.0
PROGRAM DIRECTION	32.4	34.7	42.5
ENRICHED MATERIAL	169.0	166.4	176.9
SUBTOTAL, OPERATING EXPENSES	$1,557.0	$1,663.2	$1,961.9
CAPITAL EQUIPMENT	96.3	100.5	105.6
CONSTRUCTION	289.4	328.6	345.5
TOTAL REQUEST	$1,942.7	$2,092.3	$2,413.0

($ IN THOUSANDS)

PROGRAM DIRECTION

	FY 1989 ACTUAL		FY 1990 APPROP.		FY 1991 REQUEST	
	DOLLARS	FTE'S	DOLLARS	FTE'S	DOLLARS	FTE'S
IDAHO	$ 655	10	$ 886	14 A/	$ 1,000	14
OAK RIDGE	0	0 A/	0	20 B/	1,400	20
RICHLAND	0	0 A/	0	29 B/	2,500	29
SAVANNAH RIVER	28,433	351	30,166	342	29,000	342
HEADQUARTERS	3,315	47	3,684	101 C/	8,600	121
TOTAL REQUEST	$32,403	408	$34,736	506	$42,500	526

A/ FUNDING INCLUDED FOR 13 FTE'S.

B/ PERSONNEL FUNDED IN FY 1989/1990 BY THE OFFICE OF MANAGEMENT AND ADMINISTRATION.

C/ FUNDING INCLUDED FOR 53 FTE'S.

NEW PRODUCTION REACTORS

STATEMENT OF DOMINIC J. MONETTA, DIRECTOR, OFFICE OF NEW PRODUCTION REACTORS, DEPARTMENT OF ENERGY

MISSION AND STRATEGY

Dr. KNUTH. The last scheduled witness that we have is Dr. Dominic J. Monetta, Director of the Office of New Production Reactors within DOE.

Dr. MONETTA. Good afternoon. This is the first time I have appeared before you. I took over the new production reactor program on June 12.

With your permission, I would like to submit my full statement for the record and then briefly summarize that statement.

MISSION

TO PROVIDE NEW PRODUCTION REACTOR CAPACITY ON AN URGENT SCHEDULE FOR AN ASSURED SUPPLY OF NUCLEAR MATERIALS, PRIMARILY TRITIUM, TO MAINTAIN THE NATION'S NUCLEAR DETERRENT CAPABILITY.

This is our mission, and a few key words are "new, capacity, urgent, assured, and tritium." This is really what we are all about.

We are aimed at filling the gap that we see occurring in the supply of tritium in the year 2000 and beyond.

To do that, we have an acquisition strategy that has been laid in place, which focuses on the concept of duality, duality in reactor technologies and duality in sites, and, as a contingency, a small effort that is being developed to look at a tritium target potentially for light water reactors.

DUALITY STRATEGY

- PROVIDES HIGHEST ASSURANCE OF RELIABLE TRITIUM PRODUCTION CAPACITY
- THE JULY 1988 NUCLEAR WEAPONS COUNCIL REPORT STATED:

> IT WOULD BE IMPRUDENT FOR THE NATION TO RELY UPON THE CONTINUOUS OPERATION OF A SINGLE REACTOR TO PROVIDE A DEPENDABLE, NON-INTERRUPTABLE SUPPLY OF TRITIUM AND/OR PLUTONIUM

Duality strategy is really a strategy of assurance. It is a strategy that is aimed at eliminating the pinchpoints in the system. We have a number of them. At present, Rocky Flats is probably the most outstanding example.

What we are attempting to do with this particular program is to create a situation where we have a guaranteed assurance that we will have a supply of tritium out to the year 2040.

DUALITY STRATEGY

TWO REACTOR TECHNOLOGY RATIONALE:

- REDUCES RISK OF LOSING TOTAL PRODUCTION CAPABILITY DUE TO SAFETY OR TECHNICAL PROBLEMS GENERIC TO ONE DESIGN OR DUE TO DESIGN SPECIFIC REGULATORY OR INSTITUTIONAL CHANGES
- OFFERS PRODUCTION FLEXIBILITY FOR SPRINT AND SURGE CAPABILITY FOR A RANGE OF NUCLEAR MATERIAL NEEDS
- OFFERS GREATER FLEXIBILITY IN CONTINUING PRODUCTION WHILE ONE UNIT IS SHUT DOWN FOR MAINTENANCE OR REFUELING

TWO-REACTOR STRATEGY

To do that, we are looking at two reactors of different technologies, to reduce the risk of having any one particular technology go down on us for unexpected reasons. We are looking at production flexibility from those two reactors in continuing production over the 40-year time horizon that the program is envisioned to run.

Two sites are for further assurance, inasmuch as that gives us the maximum guarantee that no naturally occurring event at any one particular site will close down the reactor that is supplying us with this critical component to the nuclear weapons program.

MAJOR PROGRAM OBJECTIVES

- PROVIDE THE PRODUCTION CAPACITY TO SUPPLY TRITIUM AND OTHER NUCLEAR MATERIALS RELIABLY AND ON A TIMELY SCHEDULE.
- PROVIDE A LEVEL OF SAFETY AND OF SAFETY ASSURANCE THAT MEETS OR EXCEEDS THAT OFFERED TO THE PUBLIC BY MODERN COMMERCIAL NUCLEAR POWER PLANTS.
- MEET OR EXCEED ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS OR STANDARDS FOR ENVIRONMENTAL COMPLIANCE.
- MANAGE THE PROGRAM IN A COST EFFECTIVE MANNER.

Our major objectives are shown here. I would like you to note the second bullet. We are literally building two of the newest, most safe, reactors in the world. That is our express purpose. That is what this program is focused on. We will do that. We will build two production reactors that are the safest, literally the safest, that have ever been attempted in this country or in the world, and we will do it in a cost-effective manner.

PRELIMINARY PROGRAM SCHEDULE AND FUNDING PROJECTIONS

BACKGROUND

- CURRENT SCHEDULES AND COSTS BASED UPON PROPONENT DATA
- PRECISION IS AT PRECONCEPTUAL DESIGN STAGE; NOT BUDGET QUALITY
- DATA ANALYZED, EVALUATED, AND MODIFIED BY DOE AND NATIONAL LABORATORIES
- EXTENSIVE OPERATING SITE INPUT UTILIZED
- CONCEPTUAL DESIGNS TO BE COMPLETED DURING 3rd QUARTER OF FY 1990
- ROD COMPLETED IN LATE 1991

As far as background goes, we are well on our way to meeting all of our objectives. We are actually slightly ahead of schedule and slightly below cost. We have our conceptual designs in place. We will finish those conceptual designs in the May-June timeframe, which is the next couple of months, and we are moving smartly toward a record of decision, which will be late in 1991, as planned and as we testified here last year, my predecessor testified, to those timetables.

DESIGN SCHEDULE

Senator JOHNSTON. Now, how far would you be from final design?

Dr. MONETTA. We will click into what we call title I, which is preliminary design, in the June-July-August timeframe of this year. That will take about 1 year. Preliminary design will get us quality budget data, which means plus or minus 15 percent on all of our costing. That will allow us to present to the Secretary of Energy a list of alternatives that will be completely costed out and that will be correlated with the environmental impact statement. This gives us the predominance of our design.

After that, there is another year to complete final design.

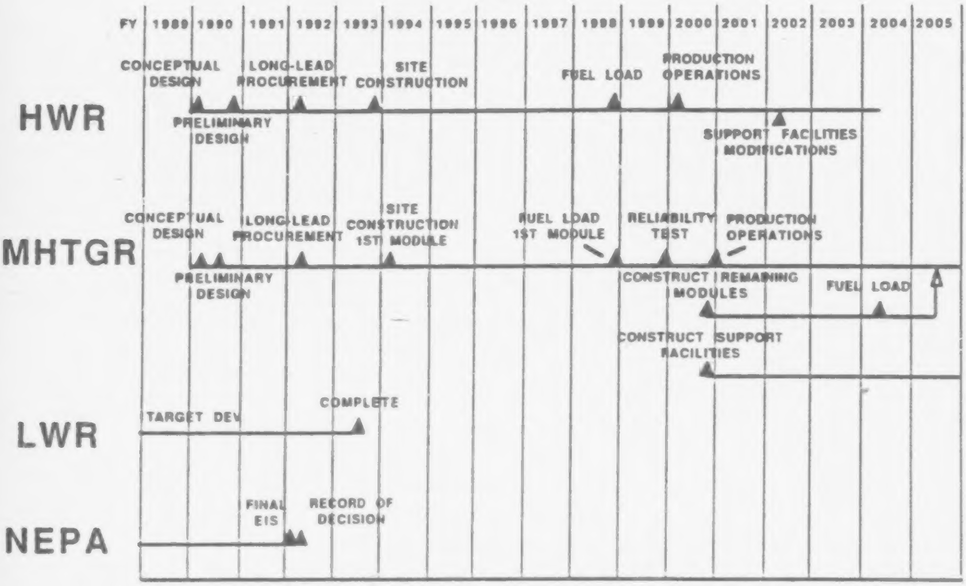
Senator McCLURE. Do you mean 1992?

Dr. MONETTA. Yes; 1992, late 1992.

ENVIRONMENTAL IMPACT STATEMENT

The next chart is really a graphic of the program. The key decision point that is coming up is that we will have a draft EIS available for public comment late this calendar year, not only in December. We will be in the field with that EIS for about 6 months. That will culminate into a final EIS to be presented somewhere around November 1991.

NEW PRODUCTION REACTORS PROGRAM
PRELIMINARY SUMMARY SCHEDULE



The activities for this year are rather well defined. I will point out the sixth bullet, which is the request for proposal for the construction manager. That RFP will go out sometime in late August of this year, one from each of the sites; that is, to get a construction manager to begin looking at what it will take to actually put the machines in place. The field project management offices are now in place and the contractors have actually set up representation on both sites.

NPR DESIGN ACQUISITION STATUS

- CONTRACTS WERE AWARDED BY CHICAGO OPERATIONS OFFICE TO:
  - TWO DESIGN TEAMS FOR THE HEAVY WATER REACTOR CONCEPTUAL DESIGN - NOVEMBER 1, 1989
  - ONE DESIGN TEAM FOR MODULAR HIGH TEMPERATURE GAS-COOLED REACTOR CONCEPTUAL DESIGN NOVEMBER 27, 1989
- CHICAGO OPERATIONS OFFICE WILL IMPLEMENT DOWN SELECTION TO ONE HWR DESIGN TEAM FOR TITLE I

CONCEPTUAL DESIGNS

The good news is that we were on time with our conceptual designs. We put them both in place in November. We got the two heavy water designs in place on the first, and, 27 days later, the gas-cooled design.

HWR CONSORTIA

- EBASCO SERVICES INC. - AE/CONSTRUCTOR/INTEGRATOR
  - BABCOCK & WILCOX - REACTOR DESIGNER AND MANUFACTURER
  - COMBUSTION ENGINEERING - CONTROL ROOM AND SAFETY SYSTEMS DESIGNER
  - ROCKWELL - REFUELING/FUEL HANDLING
  - BATTELLE - ALUMINUM FUEL SEVERE ACCIDENT ANALYSIS

- WESTINGHOUSE - BECHTEL
  - WESTINGHOUSE - REACTOR PLANT DESIGNER
  - BECHTEL - AE/BALANCE OF PLANT AND CONSTRUCTION

Those three teams are represented here. Two are for heavy water—EBASCO Services and Westinghouse/Bechtel; one is for gas cooled, called CEGA, which is a joint venture.

It is actually a new corporation, Combustion Engineering and General Atomics. CEGA is wholly owned by its two subcontractors.

ACTIVITIES FOR FY 1991

- CONTINUE WITH PRELIMINARY DESIGN (TITLE I)
- ISSUE DRAFT EIS, COMPLETE PUBLIC HEARINGS, RESOLVE PUBLIC COMMENTS AND PREPARE FINAL EIS
- CONTINUE IMPLEMENTATION OF THE SAFETY REVIEWS
- CONTINUE AND PARTIALLY COMPLETE CONFIRMATORY ENGINEERING DEVELOPMENT
- CONDUCT IRRADIATION TESTING AND DIAGNOSTIC EFFORTS TO DEMONSTRATE TRITIUM TARGET PERFORMANCE (MHTGR) AND FEASIBILITY (LWR)

Activities for next year center around completing preliminary design and getting the draft EIS issued, the outreach work done, and the final EIS will be presented around November 1991.

It is an ambitious year, and we are moving ahead rather vigorously.

I have literally hired 100 technical and professional people over the last 7 months to get this program underway.

FY 1991 CONGRESSIONAL BUDGET REQUEST
(DOLLARS IN MILLIONS)

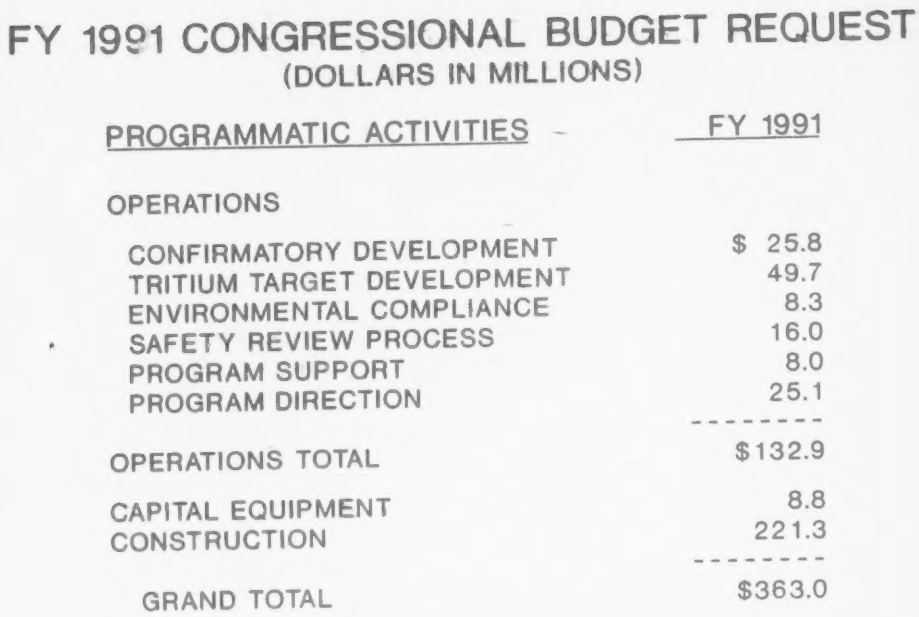
LEAD TABLE

	FY 1988	FY 1989	FY 1990	FY 1991
OPERATIONS	$ 10.0	$ 60.0	$200.4	$132.9
CAPITAL EQUIPMENT	0.0	0.0	0.0	8.8
CONSTRUCTION	10.0	0.0	98.5	221.3
TOTALS	$ 20.0	$ 60.0	$298.9	$363.0

FUNDING PROFILE

The funding profile over the last several years, is shown on the next chart.

You can see how we have ramped up rather well. We are literally in our fiscal year 1990 timeframe. We are about halfway through it and are moving aggressively into fiscal year 1991.



FY 1991 CONGRESSIONAL BUDGET REQUEST
(DOLLARS IN MILLIONS)

PROGRAMMATIC ACTIVITIES	FY 1991
OPERATIONS	
CONFIRMATORY DEVELOPMENT	$ 25.8
TRITIUM TARGET DEVELOPMENT	49.7
ENVIRONMENTAL COMPLIANCE	8.3
SAFETY REVIEW PROCESS	16.0
PROGRAM SUPPORT	8.0
PROGRAM DIRECTION	25.1

OPERATIONS TOTAL	$132.9
CAPITAL EQUIPMENT	8.8
CONSTRUCTION	221.3

GRAND TOTAL	$363.0

NPR FISCAL YEAR 1991 REQUEST

That fiscal year 1991 budget is broken down in this way. As you can see, most of it is being earmarked for what we call construction. However, that is misleading in the DOE budget. We will really not be building anything in fiscal year 1991. That is just a shift to a different color of money as we go into preliminary design.

Now, the interesting part begins. As you can see, the fiscal 1992 budget portends a rather large increase in construction. That anticipates both reactors at both sites going into final design and the beginning of long leadtime procurement on both machines. As you can see, we ramp up rather rapidly from there and we put a considerable tax on the 050 account.

ACCOMPLISHMENTS

- COMPLETED 13 NEPA SCOPING HEARINGS IN 5 STATES
- DRAFTED NPR PROGRAM PLAN
- ESTABLISHED SAFETY REVIEW PROCESS
- PREPARED EIS IMPLEMENTATION PLAN
- PREPARED THE TECHNICAL REQUIREMENTS DOCUMENT
- SELECTED A UTILITY ENGINEERING GROUP TO PROVIDE TECHNICAL EXPERTISE ON NUCLEAR PLANT SAFETY, DESIGN, CONSTRUCTION, START-UP, OPERATIONS, AND MAINTENANCE
- STARTED CONCEPTUAL DESIGN WITH 2 HWR TEAMS AND 1 MHTGR TEAM

NPR ACCOMPLISHMENTS

Our accomplishments to date are shown. These are: we have gotten a draft program plan in place. We actually presented that preliminary program plan to the Senate on March 1. A copy was delivered to all of the key Senators and their staff. We have gotten the implementation plan of the EIS briefed and in place. This is a first for DOE. This is the first time the Department of Energy has ever put out an implementation plan for an EIS for public comment and public viewing.

This particular EIS implementation plan was presented to key staffers to the Hill on January 31, and we are moving to aggressively put a group that we call the Utility Engineering Group, which is Duke Engineering, in place, to act as a smart buyer for us, to give us a significant amount of utility experience inside of our own house.

I think we have accomplished a reasonable amount of work this year and we anticipate to be well ahead of schedule and on budget next year.

Thank you.

Dr. KNUTH. Mr. Chairman, that concludes our proposed testimony. The panel of witnesses, as supported by the backup witnesses, would be pleased to answer any questions you may have.

[The statement follows:]

STATEMENT OF DR. DOMINIC J. MONETTA

Mr. Chairman and members of the Committee, I am pleased to appear before you today to present an overview of the status of the New Production Reactors Program and our budget request for FY 1991. The mission of our program is clear: to design and construct new production reactor capacity for an assured supply of nuclear materials, primarily tritium, to maintain the Nation's nuclear deterrent capability.

With the support of the Congress, we have embarked upon a course of action to ensure that these nuclear materials will be reliably produced in a safe, secure, and environmentally sound manner and in adequate amounts to meet national security requirements. This is both a necessary and ambitious endeavor, and we must make certain that our national security policies are not undermined and that all future defense policy options remain open.

To accomplish this mission, the Department's preferred strategy is to proceed with the design and construction of a Heavy Water Reactor (HWR) at the Savannah River Site and to design and construct a Modular High-Temperature Gas-Cooled Reactor (MHTGR) at the Idaho National Engineering Laboratory. As a contingency, work is to continue on the development of a Light Water Reactor (LWR) tritium target.

This strategy fully embraces the concept of duality -- using two different technologies at two different sites -- which will provide the highest assurance of reliable supplies of tritium. It is imperative that this vital concept of duality remains because it is the cornerstone of our strategy for providing assurance of production capacity for the future.

Until the final EIS and subsequent Record of Decision are issued in late 1991, the Department of Energy (DOE) will still consider all reasonable options concerning replacement production capacity. However, DOE still strongly supports the preferred strategy and will continue to pursue it on an expeditious schedule. Certainly we all endorse the prospects for peace that are sweeping our world today, but preparedness should remain as our watchword. As Secretary Watkins has stated, "Flexibility to meet contingencies, duality, and improved capability are goals that can and should be achieved."

The critical nature of the current tritium supply and the specter of what would be, in effect, unilateral disarmament if that supply could not be replenished, is our driving force. This program will eventually provide replacements for the current production reactors, and continues to be the centerpiece for modernization of the Department of Energy's nuclear weapons complex as we move into the Twenty-First Century.

The New Production Reactors Program (NPR) is well underway and we have made significant strides toward meeting our objectives. Continued strong support from the Congress will allow us to build upon the progress made so far and will enable the Department to obtain the data required to make a decision about the preferred technologies and sites for new production capacity. I would now like to provide you with a brief background description of tritium production and the vital need to ensure that the New Production Reactors Program continues forward.

Tritium, a radioactive isotope of hydrogen, is an essential ingredient in our modern nuclear weapons and is lost rapidly through natural radioactive decay. Its half life of 12.3 years equates to a loss of 5.5 percent per year of our total inventory. It must be regularly replenished or the weapon's effectiveness is dramatically reduced.

The only proven, practical method of producing tritium is the irradiation of targets in nuclear reactors. This has been acknowledged in previous studies which considered the need for construction of replacement capacity. Since the early 1980's, reports and studies have recommended that new production capacity be constructed to meet the need for replacement capacity.

The idle P, K, and L Reactors at the Savannah River Site are the Nation's only source of tritium for defense purposes. As you know, they remain shut down to allow for needed safety and operational improvements. When new reactors are constructed and ready to operate, the Savannah River Site reactors will be approximately 45 years old.

In recognition of the accelerated need for replacement capacity, and after careful analysis and consultation concerning technology and sites, DOE issued a report to Congress on August 8, 1988, announcing the Department's strategy for acquiring new nuclear materials production capacity. Since that report to Congress the Department's preferred strategy has remained unchanged.

The preferred strategy selected was based on an assessment of candidate technologies made by the Energy Research Advisory Board (ERAB); an evaluation of candidate DOE sites conducted by a Site Evaluation Team; an evaluation of comparative costs by the NPR Capacity Cost Evaluation Team; and consultations made with key agencies within the Administration, such as the Department of Defense, Office of Science and Technology, the National Security Council, and the Nuclear Weapons Council. A final decision on technologies and sites will be made by the Secretary of Energy after the completion of an Environmental Impact Statement (EIS). This formal Record of Decision is scheduled for late 1991.

As stated earlier, the preferred strategy embodies the concept of duality - a two reactor strategy, which will provide the highest assurance of reliable supplies of tritium. ERAB examined duality in its study and found that a multiple reactor strategy, utilizing diverse technologies and separate sites, would produce high production assurance, reduce uncertainties in the schedule leading to production of materials, and minimize risks to national security. The rationale for two technologies is that it reduces the risk of losing total production capacity due to unforeseen safety or technical problems generic to one design or due to design specific regulatory or institutional changes. It also offers flexibility in production capability. Multiple sites reduce the risk of loss of capability by site specific, naturally occurring events or site specific institutional or regulatory problems.

The Department is in the process of preparing Conceptual Designs and an Environmental Impact Statement to support programmatic decisions regarding sites and technologies for the NPR program. Three reactor technologies - light water, heavy water, and modular high temperature gas-cooled - are intended to be maintained as viable options until we obtain more technical data, improve cost and schedule estimates, and complete the Environmental Impact Statement review process. We are currently estimating that the Department will be able to select the best technology and sites for the NPR program by late 1991.

Substantial progress has been made in implementing this strategy. The Office of New Production Reactors was established on October 1, 1988 with its sole mission being the safe and environmentally sound construction of new production reactor capacity. This program has the unique task of coordinating and managing all Departmental activities associated with the design and construction of these reactors. The organizational philosophy of the NPR Program reflects the new approach initiated by the Secretary which calls for strong central control with increased safety, environmental, and quality assurance oversight. Separate Engineering Technology Offices for HWR, MHTGR, and LWR have been established and will maintain technical control throughout the life of the Program. Also, I have created oversight Offices for Safety and Quality and for the Environment. Finally, Project Management Offices will be established at each of the three project sites with the Project Officer reporting directly to the Director of the Program. Safety, Quality, and Environmental Field Representatives will be located at each of the three sites to serve their respective NPR Headquarters' Offices.

In keeping with Secretary Watkins' direction for strong headquarters control, the New Production Reactors Program organization has been put in place with clear lines of responsibility and authority designed to efficiently and effectively carry out our mission.

In addition to the establishment of a solid organizational structure, current activities include supporting an extensive National Environmental Policy Act

(NEPA) process. The Implementation Plan for developing an Environmental Impact Statement was issued by the Department this January and work will continue on preparing the draft EIS which we expect to be available for public review and comment in early 1991.

A safety review plan has also been developed to make certain that the highest principles of safety assurance are incorporated in the planning and are adhered to in the design and construction of the new production reactors. We will be working with the Defense Nuclear Facilities Safety Board, established by the Congress, and we are also working closely with the Department's Advisory Committee on Nuclear Facility Safety, which is currently directly involved in the review of the steps to be taken in safety assurance.

We have taken steps to incorporate sound technical management principles. These steps included the retention of a Utility Engineering Group, Duke Engineering and Services, Inc., and preparation of a comprehensive Program Plan and a detailed Technical Requirements Document. Duke Services will lend considerable commercial sector experience and expertise in all facets of the design, construction, and operation of the new production reactors. The Program Plan provides a baseline of the entire program including strategies, milestones, quantitative technical goals, time-phased objectives and resource requirements. Finally, the Technical Requirements document provides an authoritative, single-source set of baseline technical and engineering requirements. This document will be used throughout the life of this program.

The award of contracts in November 1989 for design of the HWR and MHTGR was a major milestone for the Program. Conceptual design, the first design phase, will be completed this summer and will provide the Department with budget quality cost and schedule data which will be used by the Secretary in making a final decision of the technologies and sites. Design contracts were awarded to two consortia for the design of the HWR, Ebasco Services, Inc. (Babcock & Wilcox, Combustion Engineering, Rockwell International, and Battelle) and Westinghouse - Bechtel and one consortium for the design of the MHTGR (Combustion Engineering and General Atomics - CEGA). Following completion of the conceptual designs for the HWR one design team will be selected to proceed with preliminary design. The HWR preliminary design will start in the fourth quarter of FY 1990 following the final contract selection process. The MHTGR designer is expected to start preliminary design (Title I) in the third quarter of FY 1990, ahead of schedule.

Much has been accomplished over the past year and I believe that we have laid the foundation for continued success. In the immediate future we will proceed with the environmental activities necessary for preparation of a draft EIS and, concurrently, with development, confirmatory testing and project design efforts. The pace of activities is increasing and is aimed at supporting detailed design and construction as soon as possible after a Record of Decision has been issued.

Funding in FY 1989 and FY 1990 has been at a level sufficient for initiation of design activities, analyses, continuation of the NEPA process, and confirmatory development work. The requested FY 1991 funding level of $363M, consisting of $132.9M in operating budget authority and $230.1M in capital (design) funds, is essential to support the continued broad range of activities necessary to bring new production reactor capacity on line safely, with high assurance and on a timely schedule. With the initiation of preliminary design for both reactor technologies and acceleration of the design and construction of support facilities, funding is becoming a critical factor. To maintain the pace of activities necessary to meet our schedules both near and long term, full funding of the Department's request is vitally important. The FY 1991 operating budget levels are required for the following activities:

- For confirmatory development, we are requesting $25.8M ($16.6M for HWR and $9.2M for MHTGR). This funding will be used to continue verification of design and safety requirements.

- Tritium target development funding will increase to $49.7M ($26.2 for MHTGR and $23.5 for LWR). This funding will be used for continued irradiation testing in DOE's Advanced Test Reactor and further diagnostic efforts.

- We have requested $8.3M which will be used to issue a draft EIS, conduct public hearings, resolve public comments, and prepare the final EIS.

- We have requested $16M to continue implementation of the safety review process, including the refinement of safety requirements and the continued independent reviews of safety issues and documentation resulting from design activities.

The NPR will require 115 Full-Time Equivalents in 1991. Our request of $33.1M for Program Direction and Support reflects an influx of the highly skilled expertise necessary to perform the design, safety and environmental functions described above and to manage a program of this magnitude. In addition, these funds will provide for: safety, QA, environmental, and design reviews; acquisition of data processing equipment and software; administrative activities; and contractor support to the NPR.

We are also seeking $230.1M in capital (design) funds in FY 1991 to continue with facility engineering and preliminary design. Conceptual designs will have provided detailed assessments of major concept issues and trade off studies and evaluations, identified engineering development requirements, developed improved cost estimates, and provided an initial project schedule. Preliminary (Title I) design, to be initiated in FY 1990, will take the baseline established in the Conceptual Design Report and the Requirements Document and will further define the requirements and criteria which will govern the detailed design. Title I design, which will continue through FY 1991, will be funded using construction (design) monies although no actual construction would take place until after the Record of Decision. In FY 1992, we plan to initiate Title II design, long lead procurement, and design of support facilities.

Mr. Chairman, in conclusion, I stated earlier that this was an ambitious endeavor that is absolutely essential. Our request of $363M for FY 1991 is needed to continue our mission of providing new production capacity on an expeditious schedule for eventual replacement of our current tritium supply system. Because of this, I know that the Department and the President place a high priority on the program I have just outlined. In a little over a year, we have assembled a highly qualified staff to manage this program and are continuing to seek additional qualified personnel. We have made substantial progress in advancing the NEPA process and will have completed the EIS by the end of 1991 as we move towards the Record of Decision. Your assistance in assuring adequate funding has also enabled us to retain the services of the best the commercial nuclear industry has to offer, set up stringent safety and quality assurance requirements, and most important meet our schedule of commencing conceptual design. Your continued assistance in assuring adequate funding is essential to the success of our mission of assuring the Nation a safe and reliably sound nuclear deterrent.

ROCKY FLATS COMPLIANCE AGREEMENT

Senator JOHNSTON. Thank you very much. I have just a couple of questions. Then I have to go to another meeting

First of all, on Rocky Flats—and I guess this would be for Admiral Barr—what is the current situation related to negotiations with the Department of Justice not to prosecute? How is that working out?

Admiral BARR. Do you mean what started with the FBI, the Department of Justice, raid last June?

Senator JOHNSTON. Yes; you are not in compliance now with the law.

Admiral BARR. Regarding whether we are in compliance? Yes, sir.

We have executed several compliance agreements, which provide schedules to come into compliance in the areas where we were out of compliance.

Senator JOHNSTON. And the Department of Justice has agreed not to prosecute?

Admiral BARR. I can't say that. As long as we comply with those things covered by the agreement, we are in compliance with something that the Department of Justice basically has agreed to. Once you are either outside of that—that is, in some area that comes up which was not covered, or if you failed to comply—then I think all bets are off.

We have not had a problem.

Senator JOHNSTON. How is that working out? We had some legislation pending for that process. The question is, Is this working or do you need something else?

Admiral BARR. It appears to be working, sir. I do not know of any current problems. There is, of course, an ongoing grand jury investigation.

Senator MCCLURE. Of past practices.

Admiral BARR. Sir?

Senator MCCLURE. Of past practices.

Admiral BARR. Yes; but there have been several recent subpoenas which, in fact, have subpoenaed documents which are up to date, basically.

I don't know what the grand jury is doing with those documents. I can only say that they are asking for documents which are certainly after the June timeframe. So, what will come out of that, I don't know. But, as far as the compliance agreements and living with those, at this point we have not seen any problem.

ROCKY FLATS TOXIC WASTE ISSUE

Senator JOHNSON. Your principal problem at Rocky Flats is with the toxic wastes under RCRA which regulates hazardous waste.

Admiral BARR. From the 1,601-cubic-yard standpoint and the judge's recent decision, yes, sir, with the RCRA-regulated hazardous materials.

Senator JOHNSTON. Yes; the judge has said that the State has a right to regulate these materials.

Admiral BARR. As I understand what was said, sir—and we are still trying to figure out exactly what his decision means—he has said that particularly those, what we used to call residues, that were either from the Building 771 incinerator, which would be ash, or were feed for that incinerator—kimwipes, that type of thing, which are combustible—must be governed by the RCRA law. They become hazardous materials under the definition of RCRA, and all that means is from the standpoint of State and Federal jurisdiction.

There is some question as to whether all the residues on the site would fall under that ruling. There are some words in the ruling which, at least when I read them, are not clear to me if it is only incinerator feed. It could be other residues—metals, oxides, things of that nature—which would not be put through there.

Senator JOHNSTON. Principally the problem at Rocky Flats is toxic waste, as opposed to nuclear waste; is that right?

Admiral BARR. Yes, sir; from that standpoint. I am not trying to equivocate, but the legal issues concern primarily RCRA, which is the hazardous waste problem.

Senator JOHNSTON. Well, I'm not talking about the legal issues. I'm talking about the cost of cleaning up, the difficulty of cleaning up.

Admiral BARR. Sir, I cannot say that for sure. There are certainly both components. We have radioactive material, which must be cleaned up. So, from that standpoint, I could not agree with that characterization.

WEAPON SAFETY ISSUES

Senator JOHNSTON. All right.

The bombs that contain the high explosive that are subject to fire, we have had fires on B-52's.

Admiral BARR. Yes, sir.

Senator JOHNSTON. If a fire gets to one of these bombs, is it likely to blow up and dispense plutonium? Is there nothing we can do, short of replacing those weapons?

Admiral BARR. I should point out that there have been some measures, which Dr. Barker might want to discuss a little more, taken by the Air Force in particular, to lower the likelihood of a fire. They have drastically reduced engine starts, for example, which was one of the things which could cause a fire.

SHORT-RANGE ATTACK MISSILE [SRAM]

If a fire engulfs the SRAM–A rotary dispenser, which can have up to eight of the SRAM–A's in it, it is likely that there will either be a detonation of a high explosive or a burning of the high explosive. In either case, you would get some degree of plutonium dispersal.

If all the warheads burn, as opposed to explode, the likelihood of a very widely distributed dispersal is lessened. But if you did get a detonation, and the probability is that if you get a single warhead detonating, the others probably would sympathetically detonate, then you could have dispersal over a fairly wide area.

Senator JOHNSTON. What do you mean by "fairly wide"?

Admiral BARR. Up to hundreds of square kilometers, in some of the calculations we have done.

Remember, we are not talking about nuclear detonation; this is detonation of the high explosive material in the weapon.

Senator JOHNSTON. I know. But the plutonium dispersed would be, we'd have Chernobyl in spades, wouldn't we?

Admiral BARR. Yes, sir; there's no question that that would be a very difficult time for us.

SRAM II

Senator JOHNSTON. Well why haven't we given a higher priority to replacement of those bombs? We have been talking about that for a couple of years here.

Admiral BARR. Sir, I can only talk for where we are now, and, in my opinion, that particular warhead is [deleted] warhead that we have. We will meet the DOD schedule for the missile.

Senator JOHNSTON. Which is 1993?

Admiral BARR. Sir, 1993 is when we start production. [Deleted] the SRAM–A's will come off alert [deleted].

Senator JOHNSTON. Now that doesn't sound like a [deleted] to me. Does it take between now and 1993 to begin production?

Admiral BARR. At this point the answer is yes, sir, for both the missile and the warhead.

Senator JOHNSTON. Why is that?

Dr. BARKER. It's a brandnew missile that is being developed and, in point of fact, it has had some motor development problems, which have caused a slip of 1 year in the operational date of the missile. But we have maintained the commitment to completing the build at the same schedule we had originally predicted.

Senator JOHNSTON. Now that will go on the B–1 and B–2, as well as the B–52's?

Dr. **Barker**. The SRAM will be aboard the B-1/B-2, not the B-52.

Senator **Johnston**. Well, all bombers now use the high-explosive bombs.

Dr. **Barker**. At the moment, I believe it is true that, with the current schedules, it is likely that the newest bomber will not have a SRAM-A aboard.

Senator **Johnston**. What will it have?

Dr. **Barker**. The SRAM II will be ready by the time it is operational.

Senator **Johnston**. The B-2?

Dr. **Barker**. Yes.

Admiral **Barr**. As opposed to the B-1.

Dr. **Barker**. Year [deleted] is the most rapid date that has been budgeted and predicted by both departments for production for warheads and production for missiles. It was a significant event, I think, when 2 years ago, the two departments, at the Deputy Secretary level, made a budgetary commitment to keep these programs on schedule.

Senator **Johnston**. It seems to me there ought to be something that could be done to lessen this hazard. I mean, the hazard of a fire on a B-52 I would think is a rather straightforward risk. You have fires in airplanes all the time.

Dr. **Barker**. Well, maybe I should provide for the record, Senator, a list of measures that have been taken. I think that this issue was probably initially brought to your attention several years ago, when, as part of this testimony, you were shown pictures of the B-52 fire at Grand Forks, with the scorched pattern under the aircraft. That, indeed, reinvigorated an effort to get only insensitive high explosive warheads aboard alert aircraft. It also gave rise to SAC taking a number of measures which are designed to, one, reduce the probability of an accident that could result in a fire; and, two, result in the minimization of the consequences of a fire.

Admiral Barr mentioned some of these. But the best thing for me to do may be to provide a list of measures that have been taken for the record.

[The information follows:]

MEMORANDUM FROM ROBERT B. BARKER

ASSISTANT TO THE SECRETARY OF DEFENSE
WASHINGTON, DC 20301-3050

Honorable J. Bennett Johnston
United States Senate
Washington, DC 20510

Dear Senator Johnston:

(U) I am providing the enclosed memorandum from the Air Force Inspector General as a follow-on to a question you asked during my testimony to the Energy & Water Development Subcommittee of the Senate Appropriations Committee on April 19, 1990. The memorandum summarizes significant steps that the Air Force has taken to improve the nuclear safety of the Short Range Attack Missile-A (SRAM-A) deployed on our strategic bomber force.

Deleted

(U) I firmly believe that the combination of nuclear weapon system design features and operational procedures has resulted in a bomber alert force that is safe and effective. This is true for the rest of our nuclear deterrent force, and the Department of Defense is committed to maintaining this standard.

Sincerely,

Robert B. Barker

MEMORANDUM FROM LT. GEN. BRADLEY C. HOSMER

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC 20330-1000

MEMORANDUM FOR ASSISTANT TO THE SECRETARY OF DEFENSE
(ATOMIC ENERGY) - INFORMATION MEMORANDUM

SUBJECT: Actions to Improve Short Range Attack Missile A
(SRAM A) Alert Safety (U) (Your Memo, 6 April 1990)

(U) We have prepared a list of significant actions taken that enhance the safety of SRAM-A alert operations (atch 1). Attachment 2 contains implementing documentation you requested.

Deleted

(U) Please advise if additional data is needed.

BRADLEY C. HOSMER
Lieutenant General, USAF
The Inspector General

MEMORANDUM FROM ROBERT B. BARKER

ASSISTANT TO THE SECRETARY OF DEFENSE
WASHINGTON, DC 20301-3050

5 APR 1990

MEMORANDUM FOR THE INSPECTOR GENERAL (SAF/IG), DEPARTMENT OF THE AIR FORCE

SUBJECT: Actions to Improve Short Range Attack Missile A (SRAM A) Alert Safety (U)

Deleted

(U) As I recently testified to Congress, U.S. nuclear weapons are safe as currently designed and operated. We have an obligation, however, to ensure the history/documentation of safety measures is in place and to continue to seek improvements in safety consistent with our deterrent needs.

Robert B Barker
Robert B. Barker

ACTIONS TAKEN TO ENHANCE SAFETY (U)

Deleted

  - -- (U) Start cartridges are removed from all engines before any maintenance engine run (B-52 and FB-111).
- (U) Wing senior staff representatives are notified and in-place during an alert exercise.
- (U) The fire department is notified and fire vehicles must be in position before any
  - -- (U) Exercise

Deleted

- (U) The Air Force Inspector General has directed that limitations be placed on the nuclear weapon system safety rules to formalize, at Air Force level, the restrictions directed by the Nuclear Weapons Council.

WEAPONS SAFETY

Dr. **Barker**. One thing is alert bomber engines do not start engines without a firetruck standing by. We no longer undertake cartridge starts, which introduce an explosive element into the procedure. We no longer [deleted]. So the various SAC exercises that are done are not done with these weapons.

So, we have dramatically changed procedures since that fire event to minimize the possibility of an accident, of a fire with nuclear weapons aboard.

The Secretary of Defense has been briefed on all of these measures and believes that we are taking a prudent risk in continuing to operate in the manner in which we are operating.

Senator **Johnston**. The Navy has problems as well, doesn't it?

Dr. **Barker**. The Navy continues to depend significantly on the [deleted] in it. But the Navy does not have alert aircraft. [Deleted.]

But it is true; we have to get those weapons out of the inventory as rapidly as we can.

Senator **Johnston**. Are there any other potentials for an accident?

Dr. **Barker**. For an accident?

Senator **Johnston**. For this kind of accident.

Dr. **Barker**. Well, let's see. I brought that chart with me for the last 3 years and I figured you didn't want to see it again.

We can provide for the record a chart that shows what the rate is of the introduction of insensitive high explosive weapons in the inventory and the rate of introduction of modern safety and security features on weapons in the stockpile. I guess I would be doing everybody an injustice if I tried to remember those statistics off the top of my head.

[The information follows:]

[Chart deleted.]

INSENSITIVE HIGH EXPLOSIVE

Admiral **Barr**. About [deleted] of the stockpile currently has IHE, insensitive high explosives. So, about [deleted] of it has the conventional high explosive. And, as Dr. Barker mentioned, particularly for the B–57, for a lot of the weapons with conventional explosive, the way they are generically deployed, that is, in storage sites, in silos, or in missile tubes, fire is a very, very remote possibility. So, the concern is, when you have the combination of an exposure with the conventional high explosive, then you have to take some measures, which we are trying to take in the case of the SRAM–A, to reduce the likelihood of accident.

Senator **Johnston**. I just wonder whether we ought to go to to some new way of doing this, when an ordinary [deleted]. How does it work?

U.S. ALERT POSTURE

Admiral **Barr**. [Deleted.]

Senator **Johnston**. Well, maybe we do not need to have the bombs physically on the planes—close by, or something like that might be acceptable. The need to suddenly go on alert and launch those bombers in a matter of minutes, it seems to me would not be so impacted by this procedure. When you are out in a defense condition that warrants it is another matter.

Dr. **Barker**. This is a very momentous decision. We have depended upon and put our faith in the Triad for quite some time. To take weapons off alert aircraft is to virtually go back to two legs instead of three legs. It takes hours to get those aircraft loaded and launched. So it is dramatic philosophically. It is a dramatic philosophical change to take those weapons off those aircraft.

Now, we may indeed conclude that the world situation has changed such that that constitutes an acceptable risk and this is not an issue which has escaped the attention of the Secretary of Defense or the Secretary of Energy. They had a conversation about this issue in the last year, and I suspect there will be future conversations.

The President is aware of the current status of the forces and is aware of the fact that we do have SRAM-A's aboard alert aircraft. So, at the very highest levels of the Government, this is known.

I have two conflicting emotions. One is, as I have told you every year that I've testified, I think all of us who have a role in the modernization of the stockpile need to have a commitment to get these older weapons out of the stockpile as rapidly as is feasible. It pained, I think, the Department of Energy and the Department of Defense, both, that we had to slip the introduction of the production [deleted] that we would otherwise have built.

There is one other consequence.

Senator **McClure**. Can you quantify that statement, "because of Rocky Flats"?

STOCKPILE IMPROVEMENT PROGRAM

Dr. **Barker**. Sure—in two senses, Senator McClure.

In one sense, Admiral Barr went through with you the list of system differences between what we anticipated 6 months ago and what we have now. Several things slipped because of slips in delivery systems or because of technical difficulties within the DOE program.

But, the mutual objective of our two Departments, well over a year ago, was when we had system slips, we would try to accelerate the so-called SIP Program, the Stockpile Improvement Program. We would try to accelerate the modification of bombs to introduce these safety features more rapidly. With the Rocky Flats plant being down, there was no ability to accelerate those, and, indeed, we lost some production of [deleted] which had modern safety and security features designed to replace [deleted].

Senator **McClure**. I don't mean to jump on that issue, but what I would hope to be able to illustrate to people who need to know and who are in a position to use the knowledge is that there are consequences of the actions that are taken with respect to problems, for instance, at Rocky Flats, and one of the consequences lies in the slippage of our ability to replace another hazard in another way.

Senator **Johnston**. A much greater hazard.

What is the degree of classification of the information about the hazard of bombs on airplanes?

Dr. **Barker**. There is a tremendous amount of unclassified literature about insensitive high explosive and the fact that it is more resistant to explosion in accident environments. Which specific weapons have insensitive high explosives I believe is still classified.

Admiral **Barr**. Yes; I am sure it is. A percent of composition of weapons—I can answer that specifically for the record.

[The information follows:]

WEAPONS WITH INSENSITIVE HIGH EXPLOSIVE

Weapon	Weapon name/type
B61–3	Tactical bomb.
B61–4	Do.
B61–6	Do.
B61–7	Strategic bomb.
B61–8	Tactical bomb.
B61–9	Do.
B61–10	Do.
[Deleted.]	
W80–0	SLCM.
W80–1	ALCM/ACM.
B83	Strategic bomb.
B83 ALT 904	Do.
W84	GLCM.
W84 (IR)	GLCM (IR).
W85	Pershing II.
W85 (IR)	Peshing II (IR).
W87–0	Peacekeeper—Silo.
W87 ALT 323	Do.
W87–1	SICBM.
W89	SRAM II.
B90 NSB	Strike bomb.
B90 NDB	Depth bomb.
WFOTL	Lance Follow-on
WTASM	SRAM–T.

CONVENTIONAL HIGH EXPLOSIVE

Dr. **Barker**. It is no doubt that it is dramatically better to have insensitive high explosives, to have these modern safety features deployed.

I need to remind you that from the dawning of the nuclear age until today, this thing we call noninsensitive high explosive, or conventional high explosives, has been the major element in the inventory.

When the Department of Defense, for instance, asked the Department of Energy to pick one example, to provide us with a warhead for a submarine-launched ballistic missile system, I happened to remember that one of the criteria is the anticipation of one of these things being dropped from a crane. It has to drop [deleted] feet, and the high explosive must not go off. As part of the development program, the laboratories demonstrated that a warhead can be dropped under conditions like that and the high explosive won't go off as a result.

Senator **Johnston**. Is that conventional?

Dr. **Barker**. The regular, the so-called noninsensitive high explosives, the conventional explosive.

Another example is that the Department of Energy could not design for us an [deleted] with insensitive high explosives. The system was physically too small. Maybe the technology will exist some day. But when these were designed, the feeling was one could not do it with insensitive high explosive.

And so, they were made with so-called conventional high explosive.

Part of the development program on these things is to make sure that after they go through the [deleted].

That is the way we found out that, indeed with confidence, it would get to the other end and still work.

In a few of these development tests, the [deleted] hit the ground, and the conventional high explosive did not go off.

So, these things take very, very violent events and do not go off. But sitting there and baking in a fire on an aircraft is something that might indeed make it go off.

Senator **Johnston**. Since we have our experts here, I would like to digress and ask something that is completely unconnected.

I will ask you about the big gun that we're shipping to Iraq.

Does anybody have an opinion on that?

Dr. **Barker**. My experts are not prepared to comment on that, sir. [Laughter.]

Senator **Johnston**. Senator McClure.

Gentlemen, I am going to have to go. Thank you all very much for being here and for this very informative testimony.

I will ask Senator McClure to take the gavel and preside.

PRODUCTION OF SPECIAL NUCLEAR MATERIALS

Senator **McClure** [presiding]. Thank you very much.

I will take only a short time and will then turn this over to Senator Domenici.

I notice on the chart related to the new production reactor that you have production operation starting in the year 2000 on one and the other on line between the years 2000 and 2001. That means from now until that time, at best, we are dependent upon production facilities at Savannah River.

And that leads to all of the speculation on the hazards of startup. Everything that we are talking about has to do with the expectation that, indeed, you will meet startup dates in Savannah River. If you fail to meet the dates at Savannah River, then you greatly change the slope and level of those curves.

Is that not correct, on your material supplies?

Mr. **Starostecki**. Yes, sir; you change the point at which you reduce the margin, where you cross over.

Senator **McClure**. Well, let me put it another way.

On some of the charts—and I don't remember which charts we may be talking of—tritium is not a constant. It is a declining supply. So there is a natural down-slope. I mean you get a downslope unless you have replacement.

Mr. Starostecki: Right; correct.

Senator **McClure**. And if you have Savannah River expected to keep you on a level and it is not there, there is a downslope; isn't that correct?

Dr. KNUTH. That's correct.

[Chart deleted.]

Dr. KNUTH. I think if you look at the curve there, you have [deleted].

Senator MCCLURE. [Deleted.]

Dr. KNUTH. [Deleted.]

Senator MCCLURE. Excuse me [deleted].

So you have to have restart on schedule [deleted].

Mr. STAROSTECKI. Yes.

We have [deleted] margin, and that is why it is so essential that you have the walkins, the information, once we have a decision not only on startup of the reactor, but maybe even the schedule of the reactor.

For example, the P reactor, the L reactor does not operate in the summertime because of thermal restrictions on the lake. That is one of the considerations we bring in.

Senator MCCLURE. The other uncertainty that is involved is, no matter what you say about the development of new technologies and building new plants, there is a certain degree of uncertainty in exactly what that schedule will be. You can have the best of people in the world to do the best job that is possible to be done, and things do creep in to stretch out schedules.

All I'm trying to get at is these are optimal figures. They are looking at getting Savannah River started. They are looking at operation at Savannah River at what you hope are programmed levels. They are looking at getting NPR's on those production schedules, starting in 2000 and 2001. Any slippage in any of those parameters and you have changed all of that picture; isn't that correct?

I do not mean to overstate it, but I don't want us to be led into some kind of fool's paradise here, that we know exactly what is going to happen, and this is what is going to happen, and, therefore, don't worry.

SAVANNAH RIVER REACTORS RESTART

Mr. STAROSTECKI. I think you are exactly right. There are an awful lot of assumptions underlying these curves, and you are exactly right, Senator. The assumptions are just that. They are assumptions.

What if we uncover a problem with one of the reactors that we still have not done the ultrasonic inspection on. We've only done two so far, and, fortunately, with success. But we still have a third one to get done.

What if we encounter some-further problems and we don't get the 50-percent power level? That affects those curves as well.

Senator MCCLURE. One other thing the Department cannot control is the activities of third parties who bring lawsuits.

Mr. STAROSTECKI. Yes.

Senator MCCLURE. Now, you can tell me all you want to tell me about the certainty of the outcome of lawsuits. But I've been around long enough to know that that just ain't so. The only certainty is it is going to turn out badly if you want to look at any kind of probability curves or analyses. The likelihood of lawsuits making things worse is very great, not on the contrary.

Mr. **Starostecki.** And they will wait until the last minute to do that.

Senator **McClure.** And you are assuming, in these curves, that lawsuits do not intervene to change your decision points. That is out of your control, and mine.

The specter that I keep—and it really is a specter; we are in a secure atmosphere here and I do not say this publicly—is for other obvious reasons, you have a critical national defense parameter. You can make national security waivers for certain kinds of activities, and I can foresee the time when, because of miscalculation, misadventure, accident, glitch in the design process, some kind of an extension of an operating date, a lawsuit, or whatever it may be, somebody will go to the President of the United States and say, "I'm sorry, Mr. President, but I have a bad news for you. We cannot meet our requirements and, therefore, you must either compromise national security by failing to meet our material requirements, or you must confront the public with a national security waiver of safety." And then say to the people down around Savannah River, "I'm sorry, folks, but you are going to be exposed to some hazards because national security requires it. We cannot operate those things within the parameters of normal safety requirements, but we are going to expose you to abnormal safety requirements."

I don't want to see our President in that spot—not now, not ever—not this President and not any other, because I think that is an almost totally untenable position for him to be in.

So, I am concerned. That is one of the reasons I have pushed the question of duality so hard and for so long. It's because, while we can't do anything about those hazards of a single source today, we can avoid that scenario, at least in part in the future, by avoiding the possibility that one site, one technology, holds the president of the United States hostage to that kind of critical decision.

He dare not say publicly that we are going to compromise national security. So we will just go ahead and put a brave face on it, hoping that, ~~somehow~~, they are fooled. But that, to me, is the worst of all outcomes of all of this thing.

We've talked about some of these other questions, and I certainly don't want to have a fire that ends up with any kind of nuclear or radioactive release. But to me, the scenario of a decision made by the President of the United States, that I'm sorry, we can't meet national security requirements, or that I have to waive safety and tell the public about waiving safety requirements, seems to me to be one that, whether I am around or you are around or George Bush is around, nobody should want the President of the United States to have to confront.

I view these schedules as very hardheaded. I have no doubts at all that you are doing the very best that you can, the very best that anybody can do. I have great confidence in the team of you represented here. I really do. I do not mean that facetiously at all. I have great confidence in you.

But, at the same time, I think all of us would recognize a great many different things might occur to keep the optimum from occurring on the schedules that you have outlined.

It haunts me. Now, maybe Mr. Gorbachev is the nice fellow that some people like us to believe and we don't have to do anything. Then we can just scrap all of your jobs and we will all go fishing because, obviously, we don't need all of you if Gaddhafi is the only threat we have.

POTENTIAL FOR LITIGATION

Dr. **Knuth**. I must say, Senator, that those of us who have been working on Savannah River and Rocky Flats certainly recognize the potential problems of the possible potential for litigation. For example, the requirement that we publish an EIS is going forward. The schedule we have established will meet the timeframes that we think are adequate.

But you are absolutely right. If an intervenor comes in and contests it for some other issue, it has a potential for delay. We are doing the best to deal with our lawyers to try to preplan what can be the options, where can they get us, and to try to make the EIS and what is published to be sound, so that they will meet those possible problems.

There is uncertainty and there is just a limited amount of margin that is available in these schedules before we are going to have some problems.

Senator **McClure**. Well, I think there is one certainty. I have lived through this SIS difficulty out in Idaho, and I have watched what the national environmental organizations have done. You have an aging weapons complex. It is in need of replacement almost up and down the line. SIS just happened to be the first of such projects that they could identify, and I watched what they did. I watched the way in which they mobilized public opinion. I watched what has happened. We could yield on SIS. We could yield on that by making some more optimistic assumptions about plutonium supply and about recycling and, I suspect, at least hedging our bets a little bit about materials requirements on that margin of safety on our charts.

And so, we have sold ourselves the idea that we really didn't need SIS. So that opposition went away. Well, it didn't really go away.

All of those people are there, with all of the same agenda that they had, with the same vigor, ingenuity, and all the same lawyers and all the same legal devices that are built into our law today and whatever next you decide to do will be subjected to the same kind of tactics and operation. And there will be lawsuits and there will be delays. I will guarantee it, as sure as I am sitting here today. You are not going to operate Savannah River on the schedule you believe possible.

You said it. They'll wait until the last minute. Why fire the shot before they have to? They will have maximum effect by waiting until the last possible minute and then tying you up in court.

Now, I don't mean to be gloomy about it. I just want to build into whatever we are planning a little bit of margin of safety to cover up for what I am almost certain is going to happen in terms of delays you cannot control and I cannot control. It is going to be there.

I don't know when. It may not happen within this year, and I may not be sitting at this table. But some of you will be sitting at this table, and there will be others sitting at this table who will say, "Hey, what happened?" And we'll again be scrambling with changing the curves and changing the material requirements and talking about recycling and talking about recovery of scrap, and trying to put the best face on a bad situation because we won't be able to change the situation. But we'll try to change the way we package it and present it to the American public. There is some of that.

PLUTONIUM INVENTORIES

How much of the plutonium assessments that we hear include unrecoverable materials? You mentioned that.

You and I know that it is not just a matter of economics. There is physical incapacity to recover some of that amount of plutonium which has disappeared and, therefore, is thought to be there somewhere if we can just find it and recover it. You know that is a fact.

That is always used against us in the public press, and in the public dialog, and in the public decisionmaking, and those limit what we can do. It does not matter how technically proficient you are. It's how well other people manipulate public opinion that constrain the decisionmakers.

I just share that with you, only from the standpoint of building into the system a sure knowledge that it is going to happen.

I think we are paring ourselves back to the point where you don't have that anymore. That's what I see happening. You don't have that margin anymore. Under the pressures that have already been generated, the margin has been taken away. Where do you go next?

You go to the President and say, "I want a national security waiver of the ordinary processes." And you'd better hope that the President, sitting there, doesn't ask you: "Are you responsible for getting me there?" I suspect that a President faced with that is going to look across the table at whoever tells him that and is going to shoot the messenger.

Senator **Domenici**. I would not literally do so.

Senator **McClure**. But you are not the President yet.

Thank you very much.

One other question before I yield.

SIS PROGRAM

It relates to the SIS. The decision has been made not to go forward with the completion of testing with radioactive materials, but to use surrogate materials in the completion of the SIS.

Let me say that I am not sure that that decision is right. Neither am I sure that it is wrong. But if the technology is to be put on the shelf in a condition in which we could just pull it off the shelf and use it, in case we need it, there is very little additional incremental economic cost to going ahead with the nuclear elements in the test.

You may pay a big price in terms of public reactions to that process, but a very small additional cost to complete those proof of concept tests with radioactive materials; is that not correct?

Mr. GREENBERG. I am Ray Greenberg with the SIS program office.

I think the plan that we had out in Lawrence Livermore to do tests with surrogate materials will get us the majority of the answers that we need to take the development to the point of completion, using materials that will surrogate or mimic very closely the plutonium.

Senator McCLURE. But that, you say, is the majority of what we need. What I am talking about is what does it cost us to get the remaining information that we would, if we really used plutonium.

Mr. GREENBERG. That is a big cost.

Senator McCLURE. How big a cost?

Mr. GREENBERG. I don't know what it is in terms of dollars. But we would have to put plutonium in a facility and we are really not prepared to do that and contaminate a facility with plutonium, which would be a large effort, as far as consequence of cleanup afterward. I think we can get just about all the information we need redesigning the surrogate tests to get a more complete picture, that we really can do without the plutonium test.

Senator McCLURE. Would you provide for me the additional cost in both the cost of the test and the cost of the cleanup, as separately stated costs, and to do the other element of the test?

Mr. GREENBERG. To do the other element of the test? To do the plutonium test? Sure, we would be able to do that.

Senator McCLURE. Thank you. Senator Domenici will continue the hearing.

[The information follows:]

NONHAZARDOUS MATERIALS IN LIEU OF PLUTONIUM

Based on a careful evaluation of alternatives, the Department proposes to complete the technology verifications in the Engineering Demonstration System [EDS] at the Lawrence Livermore National Laboratory [LLNL] using non-hazardous and essentially non-radioactive surrogate materials in lieu of plutonium (as previously proposed). At the time this decision was being made, the incremental cost of conducting verification with plutonium over and above the $10.7M in FY 1991 and $3.0M in FY 1992. Cleanup, decommissioning and decontamination of the EDS facility after introduction of plutonium is estimated to cost an additional $5-10M. A detailed cost estimate for the impacts of reinstatement of the Plutonium Performance Verification Series [PPVS] at this juncture have not been quantified but would certainly entail significantly greater cost and schedule impacts without commensurate program benefits.

Lawrence Livermore National Laboratory has achieved excellent test results to date based on integrated system runs using non-hazardous materials in lieu of plutonium. Although cost is a significant factor, the success achieved to date contributed to the Department's proposal to complete the development program in the Engineering Demonstration System [EDS] facility without the use of plutonium. This proposal expedites completion of development in a timely and cost effective manner without the additional risk and decontamination costs imposed by the introduction of plutonium. The Department is confident that this proposal will maintain a viable option to deploy the technology at a future date without substantial additional development on a schedule responsive to a postulated national security scenario.

SPECIAL MATERIALS R&D LAB

Senator DOMENICI [presiding]. Thank you, Senator McClure.

I'm not going to take very long.

I just want to say to all of you that I have a genuine interest in all of this. I just happened to have a conflict. We are trying to see how we analyze the overall defense cuts in terms of various positions, proposals around this place, to melt down defense.

Regarding the special nuclear materials R&D lab at Los Alamos, a very big operation, I don't want to take time to talk about it here. But let me just say to you that we are having a great deal of difficulty explaining its ultimate usage, considering its enormous size. It involves plutonium; it is an R&D facility. The Secretary of Energy and Admiral Barr have said over and over that that is what it is.

We may have to get you up here and just sit down and talk with you a little bit about it.

Admiral **Barr**. We would be happy to do so.

Senator **Domenici**. You know, we are not against big facilities, obviously. But when you get up to $250 million or so over total construction life, and people talk about it taking the place of Rocky Flats in case you are in trouble, we keep saying just what you keep saying, Admiral, that that's not what it's for. But we just think we need a little better picture and my staff will work with you so we can talk about it.

Rather than talk specifically about the issues that the two Senators have raised—and I think some of you have been around for a few years, and some of you not for quite so long—to the extent that we do things rather strangely here in the Congress, I think it pretty much is acknowledged that this subcommittee, the Energy and Water Appropriations Subcommittee, which is a very strange committee to be handling the nuclear defense of this country has done a pretty good job. I think we have been very fortunate to have people like both of these two Senators, and, God willing, even though Jim is leaving, I will be around, and I will try to pick up a little bit where he leaves off in the next few years.

But I have a couple of concerns that are general in nature as we move in this period of great defense transition and reduction.

First, let me just state a concern.

I have been a very staunch advocate of keeping the nuclear deterrent capability of this Nation in the Department of Energy, pursuant to what many of us call the Truman doctrine. I remain such.

We even went through an ordeal where, through a fiscal policy analysis, we almost got to the point where Defense, where DOD, was going to make all the decisions, and you remember that blue ribbon commission. We won out. And it is people like Dr. Schlesinger and others who decided that the Department of Energy ought to basically still be in control.

But I have a concern as we approach building down defense.

Any of you who looks at history knows that we are damn poor at building down. We normally disarm. I think what worries me most about the nuclear part is that we have the nuclear activity—everything that has been spoken of here and more, what is the arsenal going to look like—we have it in this builddown period, and we have had nothing like this before in a builddown. We have it separated from the Department of Defense, who is busy over there, running around cutting defense.

I'm not sure anybody knows where we are going to come out. There are some principles being established and everybody is trying like hell to be logical. But we are not necessarily going to be.

So let me just state my concern and whoever would answer it, please do.

As the Department of Defense looks at reducing the defense budget and is assigned numbers that they are supposed to reach in terms of annual fiscal expenditures, are you all, who are in charge of the nuclear part of it through DOE, satisfied that the Department of Energy, the Department of Defense is adequately advised and concerned about all of the problems that we have at this stage of this part of the defense cycle?

Is the communication, as the budgets are put together over there and the recommendations made overall between DOE and DOD, is DOD sufficiently informed as to the kinds of problems that you have?

DOE/DOD BUDGET AND PLANNING

Admiral **Barr**. Let me start, Senator. I think Dr. Barker and I should answer that since we are the primary conduits. I try very hard to keep the DOD informed, and I think they try hard to keep me informed of just the kind of things you are talking about now.

So I would say, from my standpoint, that I think I keep them informed. I think they keep me informed. It is not going to make the answers any easier. But, hopefully, at least we go in to having to find those answers with a better degree of knowledge than we might otherwise do.

I guess Dr. Barker would like to answer from his perspective.

Dr. **Barker**. The Nuclear Weapons Council was established by the Congress several years ago to provide for an interface at a quite high level. The Chairman of that committee is the Director of Research and Engineering. The other Defense member is the Vice Chairman of the Joint Chiefs. The third member is appointed by the Secretary of Energy; currently the Under Secretary of Energy, Mr. Tuck, is filling that capacity.

Those gentlemen are kept as well informed as Admiral Barr and I can keep them informed of what the budget situation is on both sides of defense, as far as nuclear weapon systems are concerned.

The Secretaries, indeed, met with the President at the National Security Council level in conjunction with the DOE budget for 1991, and that was discussed at that level, with OMB playing a part in those discussions.

I think there is no difficulty about the mechanisms. The mechanisms are there for the two Departments to communicate with each other, for the two Department heads to communicate with OMB, and for all three of them to communicate with the President about these issues.

But I have to agree with you, Senator, that it behooves all of us to go into this process with some degree of concern. What we are facing, as you said, is a clear decline in the overall defense budget at a time when the Department of Energy is coming forward with incredible funding needs for environmental restoration and enhancing the safety and health of the DOE complex.

And so, we do not kid ourselves. We say that a DOE budget grew, I think you said 11 percent in your testimony——

Admiral BARR. Yes.

Dr. BARKER [continuing]. And an environment where defense is declining—and yet we are getting fewer warheads out the door for those same dollars because of an increasing ES&H requirements. This is bound to create some degree of tension between the two Departments, unless there is an adequate understanding and appreciation for the environmental restoration and health and safety burdens of the Department of Energy.

ENVIRONMENTAL CLEANUP BUDGET

Senator DOMENICI. I might say to the appropriations staff that is here that it has even come to me, although this is just a technical issue. You know how we break up defense, where 050 is the big ticket item, and then we put the DOE part in another one. What is really happening is the DOE gets this big increase and most of it is for environmental cleanup. The appropriators are very prone to give everything and then some to the environmental cleanup part. That is just the order of the day.

I have even talked that maybe it might be in order to find out how we would break that function within the budget even down one more step and let DOE submit an environmental cleanup number that is unrelated to the rest.

Mr. JONES. That has been done this year.

Senator DOMENICI. You have done it this year? So it is a separate item, and it goes up dramatically?

Mr. JONES. It is not in this budget.

Dr. KNUTH. It is not in this particular budget that we are discussing today.

Mr. JONES. It is still counted as a part of 050.

Senator DOMENICI. Yes; but we can line it in a way that we can understand if it is increasing.

Dr. BARKER. Senator, if I may, I think you have raised a good issue and I would not want you to go away thinking that the problem is solved.

When you get a chance to look at the charts that are part of the DOE presentation, you will find that, while environmental restoration may be an identified and separate budget item, the ES&H—there are cost growths in every single program element that do not contribute to what you and I used to think of as the product of those functions. So the RDT&E function is larger, but those dollars are not going to pay for more scientists and engineers doing nuclear weapons research. They are going to work on health and safety issues within those program elements. Production goes up; it is not weapons out the door.

Admiral BARR. It is clearly true. For example, in the P&S budget, the request goes up about 16 percent from 1990 to 1991, yet there is only a 2-percent increase in the actual direct weapons production. The rest of it is for environment, safety, and health issues.

While Mr. Duffy's budget, in the Office of Environmental Restoration and Waste Management, is, in fact, separated out, there are a number of items related to environment, safety, and health which do find their way into the production and surveillance and the RD&T budget.

I would also point out that the need to modernize the complex, which Senator McClure mentioned, is another driver here. I guess from my standpoint, what I would say is that we have underfunded those areas for a long, long time, and, unfortunately, a lot of things are converging at this point, which means that we cannot continue not to do some of the environmental, safety, health, and modernization things.

So, as I mentioned, we probably will all understand the reasons. It's not going to make the answers any easier, though. That will be very, very difficult.

Senator **Domenici**. I guess the notion that I have is just a practical one and may not be terribly relevant. Frankly, one need just wake up in the morning to know that we are living in a very active environmental era. And, to the extent that additions to this budget, be it Mr. Duffy's or be it ES&H kind of work that is included within the other functions, to the extent that we can make it clear around here that those items are why we might need new money and not borrow from the basic function, and do it in a very lucid way, I think the chances of getting them funded are better.

Now, incidentally, that was not the case 4 years ago, and a lot of this environmental restoration we underfunded ourselves. The administration did. But a couple of times we did not have enough money in our subcommittees, and we put in less for environmental cleanup than was asked for.

I remember one year the House would not even give us the amendment that we put in. We provided $64 million extra, and they gave us one-half of it in a conference. That was in pre-Duffy days, but it was in this cleanup.

I am concerned, and I think to the extent that anybody can work a way that we put in what we need for the normal operations, be it modernization, whatever you call it, from the standpoint of our weapon system, and isolate as much as possible the environmental, so that around here we know that some of the increase is for it, the chances are better for getting more money.

Now I'm not trying to spend money. I'm just trying not to squeeze out the things that we are worried about in the future, because we have to spend the money on the environment.

WEAPON DEVELOPMENT WORKLOAD

Let me just give you an example of a problem and just work back from it for a minute.

Los Alamos is in the midst of four phase 3 weapon development program. I think it is fairly certain that only one is likely to become a weapon. I don't believe we are going to be able to afford this kind of thing in the future, though, from my standpoint, great scientists assembled up there, doing these kinds of things, create a great complex. Nobody likes that better than me from the standpoint of its resource.

But I do not believe that kind of activity is going to continue for another decade. We are going to have to have some kind of rebuilding of this entire weapons thinking and what prototypes and which ones to work on.

I would just ask generally: Is that kind of thinking going on?

Admiral **Barr**. I take it, Senator, you are referring to the fact that some of them—for example, FOTL—might never make it out of phase 3?

Senator **Domenici**. Yes.

You know, I am fearful that if we were not in here, somebody would just say that this is a kind of—I'm just going to use conventional words—waste that we are not going to be able to afford in the future.

Now you and I would not call it a waste. But, obviously, we are going to have to change the way we do some of these things in terms of the overall plan and the overall complex.

POM PROCESS FOR 1992 TO 1997

Dr. **Barker**. If I may, Senator, we are now, the Defense Department, in the midst of the 1992 to 1997 POM process. Across the board I think the Congress has asked various representatives of the Department of Defense when are you going to come in with the most dramatic events in Eastern Europe budget as opposed to the budget that the President presented.

The Defense Department's contribution to that is this 1992 to 1997 POM where, hopefully, we are doing the best job we can. The Secretary of Defense is very personally involved in this whole thing.

Senator **Domenici**. I understand.

Dr. **Barker**. It would be premature at this time to say what that outcome is going to be.

All of the services will be involved, the Joint Chiefs will be involved, and the Offices of the Under Secretary for Acquisition and Policy will be heavily involved.

It is very clear, I think, that if trends continue, we will have a smaller number of nuclear weapons. In other words, the total size of the stockpile will come down.

What is less obvious is that there will be a need for a smaller number of weapon types in the inventory. What we really depend upon the nuclear weapons laboratories for—Los Alamos, Livermore, and Sandia—is for the research and development that creates those different weapon types.

I think that events much more dramatic than what have occurred will be required before we will see a significant reduction in the types of weapons.

But it is true that we will have to do a better job of articulating that requirement, and, hopefully, we will be in a better position to do that with this 1992-97 POM in hand and with the defense guidance that is associated with it.

I would hope that 1 year from now we could do a lot better job than we can do today.

Senator **Domenici**. I certainly was not pushing for expediting it; but, rather, was just trying to find out that it is being done.

Dr. **Barker**. It is, sir.

Senator DOMENICI. Frankly, I believe those who think the Department of Defense, whoever is managing it, short of somebody that is omniscient, I believe it is pretty hard to tell the world what America's defenses will look like over the next 5 years when we don't know how the world will look. It is still a very changing world. It seems to me that we know some things and we ought to respond. But we don't know a lot of other things, and it is very hard to say that there will be a $250 billion saving in defense over the next 5 years when we don't know how this world is shaking out yet. That is pretty hard to sell around here.

Maybe we should take it 1 year at a time and hope for the best until we get a little better picture.

VERIFICATION AND CONTROL TECHNOLOGY

My last question has to do with verification activities. Who knows what our labs do in this area?

Would you please state your name for the record.

Dr. ALESSI. I am Dr. Victor Alessi.

Senator DOMENICI. Thank you.

Doctor, let me say that it seems to me that verification technology, verification science, because of a myriad of treaties that are going to occur with the Soviet Union and not just like we have already experienced—and they are already talking about chemical weapons. I am concerned, and I would like your views, that some of the most significant science on this is vested in these national laboratories, and some of the most important capability to develop verification technology and meet specs and really actually be advisers while we are negotiating these various treaties that require new and different kinds of responses are vested in our laboratories. I guess Sandia is about as equipped as any around.

I am concerned that they are not apt to be given as much of a role as their expertise and talent justifies.

Could I stop there and ask you, first, does that concern you? Is that a concern of yours, Doctor?

Dr. ALESSI. It is a concern of mine that we would not use them as effectively as we might.

I think that the Department has gone well out of its way to highlight the talents of the laboratories. For example, the Secretary offered to each of the negotiators a laboratory expert who would be his personal, technical adviser and who would provide to that ambassador a window into all the expertise of the national laboratories. In fact, the first of those experts was Dr. Larry Walker, from Sandia Laboratories. The second one was Dr. Ed Dowdy from Los Alamos.

That is continuing. We have one such adviser with the START negotiations. We have, when requested, done that for the defense and space negotiations. There is a laboratory adviser to Ambassador Ledogar right now for the chemical weapons negotiations. In the nuclear testing negotiations, we have had a small battalion of laboratory advisers there because that is really the heart of their expertise. We have offered such expertise for the conventional forces in Europe negotiations, and I fully expect that we will have the same capability to support any future negotiations on nuclear weapons.

Senator DOMENICI. I believe it is a fair statement, Doctor, that at this late stage in the evolution of our treaty negotiations, we still do not have within the U.S. Government apparatus a single agency institution or executive focal point for all of this activity in the field of verification and verification technology. DNA has a role; OSIA has a role; and DARPA has a role.

I would just like your view.

NEED FOR VERIFICATION AND CONTROL AGENCY

Do you think that we are, sooner or later, going to have to put this under someone, and by someone, I mean an agency with some kind of institutional capability, with a head?

Dr. ALESSI. I am not sure that we will have to do that. Each of the agencies brings to the table certain expertise and certain perspectives.

For example, the national laboratories bring a longer view of R&D. We look forward to the future, trying to anticipate the verification technology needs into the future.

DNA has a shorter term perspective. They are much better at doing tests and evaluation of existing technologies and how they might apply to our systems.

We have forged partnerships with DNA, for example, in tagging for the START negotiations. And, even more recently, in terms of coordination, the President has formed a verification technology advisory group under the cochairmanship of ACDA and CIA, which will advise those other agencies involved in verification on what the needs will be into the future.

Senator DOMENICI. Who is the general there? Is it General Fairfield?

Dr. ALESSI. General Fairfield is in the Department of Defense, Acquisition.

Senator DOMENICI. What is his role in this?

Dr. ALESSI. I guess he would have oversight over DNA's research in this area.

Dr. BARKER. I should probably respond.

Within the Under Secretary of Defense for Acquisition, there are concerns about the various aspects of verification—everywhere from the impact of Soviet inspections on the performance of contractor facilities, to perform missions for the Department of Defense, verification, research, and development being another component of it. Under General Fairfield's chairmanship is a group that has representatives from all elements of the Department of Defense, all the way from those that monitor production through those that are responsible for research. It is really a forum within which the individuals responsible for different areas of arms control share information. So those who are worrying about chemical weapons verification, implementation as well as R&D, can share with people worrying about START verification, R&D and START implementation, can share their concerns about the impact of verification, as well as verification, research, and development activities.

So it is a broad area of responsibility; but it is an area for sharing, not an area for management.

Senator **Domenici**. I ask either you or Dr. Alessi, are you at all concerned that, within the Department of Energy, there may be more—I'm trying to think of the right word—more bureaucracy in this area than those who want things to happen and are trying to make them happen might want?

Dr. **Barker**. I think there clearly is more confusion in this area than is now desirable. I am not sure there is any more confusion than is typical of the startup of any brand new effort.

The numbers that we put together indicate that the whole verification area may be a $1 billion a year activity before too long. As I say, its implications go all the way from research and development through, in the name of verification of the Chemical Weapons Treaty, people going into Los Alamos and Sandia looking for a chemical weapons production capacity.

Senator **Domenici**. Let me just close by saying this.

I am genuinely concerned. I agree with your last remark. I think this is going to be a very big ticket item. I think it is not all going to be research. But we always need a super kind of broad-based research capability. It is very diverse.

We are going to end up with this being a business—I mean, fabricating and making the kind of verification things and training teams who go off to Russia, be it in the Urals or somewhere else, is going to be big-time business.

I don't want to see the Department of Energy, which has furnished most of the expertise on a continuing basis—and they will all admit that, and they all have a little bit of expertise. But they are quick to say between Sandia and Los Alamos, and a little bit here and there, you all have it. I don't want to see you all get lost in the shuffle of some kind of organization.

Are you satisfied that you are in the loop and that you are a part of this?

Dr. **Alessi**. I believe we are in the loop. In fact, I think that we are making major contributions across the board in verification technology. We are working very cooperatively, in partnership, with the Department of Defense in making sure that the verification technology of the national laboratories is brought to bear in our new agreements. I think the Department of Defense is very pleased with what they are getting from the national laboratories.

Senator **Domenici**. Is there anything else?

[No response.]

ENVIRONMENTAL HEALTH AND SAFETY BUDGET

Senator **Domenici**. Here is a good idea and perhaps you can help us with it. I think it is beneficial to our work and certainly to some of the concerns you have expressed.

Regarding the environmental budget, would you provide us, for the record, a breakdown of the budget for all weapons activity, showing the basic core program for R&D—testing, materials, production, et cetera—with the Duffy-type environmental modernization and basic mission, so that we can distinguish them?

Admiral **Barr**. Yes, Senator, we can provide that for the record.

Senator DOMENICI. We know the separated Duffy stuff. We want what you can give us where it is integrated with the other defense program activities.

[The information follows:]

ENVIRONMENTAL, SAFETY, AND HEALTH CROSSCUT

The Department has established a crosscut that collects funding data relevant to environmental, safety, and health (ES&H) efforts. The ES&H crosscut for Defense Programs includes funding data for environmental base program activities; safety and health base program activities; and safety and health corrective actions. The following is a description of these activities.

The environmental base program is normal, routine activity performed to assure sound environmental management practice consistent with DOE environmental policy, orders, and applicable regulatory requirements including oversight and assurance, monitoring activities, and routine compliance matters.

Oversight and assurance activities include audits, inspections, reporting, standards development, etc; planning, management and technical work including training; and operation and maintenance of end-of-the-line facilities such as waste treatment plants and disposal facilities. Also included are identification of applicable regulations, permit applications and renewals, dispersion and pathway modeling, environmental impact assessment activities, and environmental protection strategies and plans.

Monitoring includes effluent and environmental monitoring. Effluent monitoring includes collection and analysis of samples and other measurements for the purpose of establishing the type and concentration of radioactive and non-radioactive pollutants in liquids and airborne discharges from DOE facilities. Environmental monitoring includes sample collection and analysis of environmental media, i.e., air, water, soil, foodstuffs, biota, etc., from the environs of DOE sites for assessing effects of DOE operations at that site on the local environment.

Other environmental activities include routine activities undertaken in response to requirements of miscellaneous environmental laws and regulations; e.g., Endangered Species Act, Material Historic Preservation Act, Federal Insecticide, Fungicide and Rodenticide Act, etc.

The base program for safety and health includes, but is not limited to, the following functional areas: nuclear safety, health physics, operational safety, quality assurance, medical services, fire protection, emergency preparedness, and planning and response. Tasks performed within each of these programs include research and development, monitoring, and any other activity to ensure operations consistent with DOE health and safety orders and applicable external regulatory requirements.

Safety and health corrective actions are classified by type of facility as follows: Nuclear Reactor, Non-Reactor, and Non-Nuclear.

The Nuclear Reactor subactivity covers a wide range of corrective actions for reactor facilities identified in site ES&H plans such as improvements in reactor instrumentation and controls and fire system upgrades and surveillance/monitoring improvements.

The Nuclear Non-Reactor subactivity covers a wide range of safety and health corrective actions at non-reactor nuclear facilities such as acquisition and installation of continuous air monitors; replacement of explosive facilities to meet new safety requirements; and upgrades in ventilation systems for enhanced radiation control.

The Non-nuclear subactivity covers a wide range of safety and health corrective actions at non-nuclear facilities such as replacement of the plant evacuation notification system; implementation of asbestos abatement programs; and upgrades of emergency operating centers.

The following summarizes the ES&H portion of the total Defense Programs budgets for fiscal years 1989 through 1991.

DEFENSE PROGRAMS/ES&H COMPARISON

[Dollar amounts in millions]

	Fiscal year—		
	1989	1990	1991
Total DP budget	$6,246.2	$6,721.9	$7,491.0
ES&H DP component	(745.4)	(835.8)	(1,005.4)

ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Senator DOMENICI. As indicated earlier, there are additional questions which I will put in the record at this point for your response.

[The following questions were not asked at the hearing but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR JOHNSTON

Rocky Flats Plutonium Recovery Modification Project

Question: DOE has proposed constructing a new plutonium recycling facility at Rocky Flats. The last such facility to be built there, Building 371, essentially never operated. What actions are you taking to insure that the proposed facility will indeed function as advertised?

Answer: The Plutonium Recovery Modification Project (PRMP) has been organized consistent with fundamentally sound and proven techniques for technical project management to avoid the management and operational problems previously encountered with Building 371. To ensure the PRMP's success, DOE is applying a rigorous, tightly controlled technical management system. This system has prompted a top-to-bottom review of applicable technologies, resulting in further safety improvements and reductions in production residues and wastes. It also incorporates comprehensive procedures, with management approvals and independent reviews of design and engineering work and any future modifications.

Question: Why has DOE proposed constructing a new plutonium facility at Rocky Flats. Why not simply renovate Building 371 as originally planned.

Answer: Construction of a new plutonium facility is not the preferred DOE option. The Plutonium Recovery Modification Project (PRMP) renovated Building 371, a fundamentally sound and useable structure. The current DOE plan for PRMP also includes construction of an extension to enlarge the available area in Building 371. The additional floor space is required to accommodate redundant safety class equipment required by the new DOE general design criteria (DOE Order 6430.1A, April 1989, General Design Criteria). This redundant equipment includes fans, filters, air plenums, generators, control rooms, and other backup systems which cannot all physically be fit into the existing Building 371.

Question: What was the initial Total Estimated Cost (TEC) for the Plutonium Recovery and Modification Project (PRMP)?

Answer: The original Total Estimated Cost for the Plutonium Recovery Modification Project was validated in May 1987 at $370.8 million.

Question: In your letter of February 23 accompanying DOE's Omnibus Reprogramming Request, you state that TEC continues to be reviewed and refined, in part due to more stringent design standards for environment, safety and health equipment. You state that the present estimate is $500-600 million. What is your latest estimate and do you expect costs to rise further prior to construction? What costs associated with the project are most uncertain?

Answer: The latest construction cost estimate is $552 million. DOE still must review this estimate in detail, but the estimate is considered reasonably solid.

Two areas of uncertainty have the greatest potential to drive costs higher prior to construction. They are the general areas of safety and environment, as DOE continues to upgrade its standards.

Also, completion of the project depends on development of a funding strategy which can work within potentially constrained defense budgetary resources in the outyears.

Question: In your letter of February 23 to this subcommittee, you requested $8.8 million in immediate funding to recycle plutonium parts from the W62 Minuteman III and W68 Poseidon warheads at the Savannah River Site. In light of this major initiative, why are you proposing to construct new plutonium recycling capacity at Rocky Flats?

Answer: The Plutonium Recovery Modification Project (PRMP) is proposed to process retired stockpile weapons, process routine weapons component manufacturing and plant residues, and process the *Deleted* backlog of plutonium-bearing residues. The initiative at Savannah River Site for parts from the W62 and W68 will provide processing for only a small portion of the retirements from the stockpile. PRMP is still needed, if we are to replace Buildings 771 and 776, to process the majority of the stockpile retirements, and all Rocky Flats routine and backlog residues.

Plutonium Recycle Capabilities

Question: Please describe DOE's existing plutonium recycling capacity at the Savannah River Site, Hanford, and Los Alamos National Laboratory in terms of capacity, age, and types and quantities of materials that can be recycled. Please state specifically whether these facilities can recycle: (a) plutonium scrap, (b) plutonium oxides, (c) plutonium from retired warheads, or (d) plutonium from other types of residues.

Answer: The Department has operated the plutonium scrap and residue recovery facilities at the Savannah River Site, Hanford and the Los Alamos National Laboratory as capabilities and schedules permit. The types of plutonium scrap material that can be processed varies from site to site, and DOE continues to evaluate where best to provide for recovery of plutonium from these materials. At the Savannah River Site, plutonium can be recovered from plutonium oxides, uranium and plutonium oxide mixtures, nonspecification plutonium scrap metals and from plutonium/aluminum alloys. Recovery of plutonium from weapons returns will be possible at the Savannah River Site in FY 1991 when the New Special Recovery facility becomes operational. At Hanford, plutonium recovery from scrap and residues is provided in the Plutonium Reclamation Facility. This facility is capable of processing plutonium oxides, plutonium scrap metals, plutonium nitrate solutions, plutonium sludges and plutonium ash. There are no existing or planned capabilities for processing of weapons returns at Hanford. At the Los Alamos National Laboratory, a wider variety of plutonium residues can be recovered as these facilities are operated primarily for research and development purposes. In addition to the residues currently being processed at the Savannah River Site and in the Plutonium Reclamation Facility, Los Alamos facilities can be operated to process plutonium/beryllium sources, impure plutonium metals, plutonium/chloride oxides and a variety of low grade plutonium bearing materials. The capacities for recovery of plutonium from scrap and residue materials are variable and, at Savannah River and Hanford, are dependent on other baseline plutonium production missions. The capacities at Los Alamos vary with the quality of the plutonium bearing material, particularly since these recovery facilities are operated, in part, to develop recovery methods. In any event, the amount of materials available through operation of these facilities is small compared to the capabilities of the Rocky Flats Plant. DOE continues to evaluate its complex wide plutonium recovery capabilities and will take appropriate measures to maximize the efficiency of the recovery program.

Unshippable Residues

Question: Are there any forms of recoverable plutonium that cannot be transported from the Rocky Flats site? If yes, why can't they be transported? Please describe the types and quantities of these materials.

Answer: Most of the recoverable plutonium residues at Rocky Flats cannot currently be transported due to Department of Transportation (DOT) regulations. For shipment, residues must generally be free of corrosives, liquids, container pressurization potential, and have minimum reactivity or chance of combustion. Residues must also be sized to fit into the DOT-approved containers. All plutonium residues require some pretreatment and repackaging prior to shipment. Currently, an approved preparation and shipping method exists only for foundry oxide, ash, and pyrochemical salts, approximately 14 percent of the *Deleted* total. The following list shows the general categories and approximate quantities of the unshippable residues.

PLUTONIUM RESIDUE BACKLOG (APPROXIMATE)

MATERIAL	NET WT (KG)	SHIPPABLE
Leaded Gloves	4,300	
Combustibles	40,600	
Oxide Heels	*Deleted*	
Graphics and Fines	17,100	
Sand, Slag and Crucibles	5,100	
Ash	11,100	X
Ash Heels	8,900	
Soot	700	
MSE Salts	*Deleted*	X
Electrorefining Salts	2,500	X
Direct Oxide Reduction Salts	3,700	X
Glass	1,700	
Resin	1,500	
Incinerator Sludge	5,900	
Firebrick	4,500	
Special Crucibles	11,400	
Heavy Metal	2,600	
Filters	1,400	
Insulation	2,500	
Classified Items	*Deleted*	
	Deleted	

Justification for PRMP

Question: The National Academy of Sciences stated in its December report The Nuclear Weapons Complex that "The current supply of plutonium and the current capacity to process both virgin and recycled plutonium from retired weapons or scrap are adequate to meet the demand for maintaining a stockpile similar to the current one."

The report added that "given the toxicity and long-lived nature of plutonium, it is not sensible to produce more plutonium than we need." Given these facts, why are you proposing to spend over half a billion dollars on the Plutonium Recovery and Modification Project at Rocky Flats? Please explain how this is cost effective for DOE.

Answer: Underlying the DOE commitment to provide modern plutonium processing capacity for the long term, is the fact that there exists sufficient plutonium, without the need for virgin plutonium, which can be made for reuse through processing to "clean up" the material. Rocky Flats is critical to this effort. The National Academy of Sciences (NAS) report seemed to accept the continued operation of the aged Buildings 771 and 776 to meet the recycling mission. Buildings 771 and 776 cannot meet today's safety criteria for new facilities, nor can they be upgraded to meet these criteria at any cost comparable to PRMP. Capacity at other sites, such as the Savannah River Site (SRS) or the Los Alamos National Laboratory (LANL) is limited and could only provide about half the needed capacity after major capital investment. For SRS or LANL to provide capacity in facilities that meet current standards would require entirely new facilities, at a cost more expensive than the PRMP renovation of Building 371. All options to provide the plutonium recovery processing in modern, criteria compliant facilities are less cost effective than PRMP.

Rocky Flats

Question: Other than the W88 warhead for the Trident II missile, what other warheads or bombs will be or are being affected by the cessation of production in building 707 at Rocky Flats?

Answer:

Deleted

Modernization and Rocky Flats

Question: Do you agree with the conclusions in the December 1988 Nuclear Weapons Complex Modernization Report (the 2010 study) that activities at Rocky Flats should be relocated beginning in 1995? If no, please explain what factors have influenced you to reverse Secretary Herrington's decision. If yes, please respond to the statement in the National Academy of Sciences report that, "serious questions exist about the cost-effectiveness of the Building 371 renovation (if DOE concludes, as the modernization report urges), that all operations now at Rocky Flats should be moved elsewhere."

Answer: The recommendations of the "2010 Study" as well as its basic assumptions are being reviewed by the Modernization Review Committee. This includes the recommendation for the relocation of activities currently performed at the Rocky Flats Plant. A modernization Programmatic Environmental Impact Statement is scheduled to result in a "record of decision" in FY 1993 concerning Nuclear Weapons Complex relocations. At this time, it is our preferred approach to phase out Rocky Flats operations for the long term. However, even if the recommendation to relocate is supported, the phaseout of operations at Rocky Flats will not take place until the activity has been replicated at a new site. This will require many years; thus the Plutonium Recovery Modification Project (Building 371 renovation) is needed to provide a facility which meets modern safety and environmental standards and ensures reliable plutonium processing for the remainder of the useful life of Rocky Flats.

Design Basis Accident Criteria

Question: DOE's budget request states that Building 371, as constructed, does not meet current Design Basis Accident (DBA) criteria. Following its planned renovation as part of the Plutonium Recovery and Modification Project, will Building 371 meet these criteria? If not, why is it being renovated?

Answer: The wording on the Schedule 44 that was submitted was poorly phrased and can be misunderstood. At present, Building 371 does not meet the upgraded safety requirements in DOE Order 6430.IA

(April 1989); but it does meet the Design Basis Accident (DBA) criteria for earthquake, wind, and tornado. Both will be met after the modification/renovation is complete.

Rocky Flats

Question: Are activities at Rocky Flats still governed by Deputy Secretary Moore's comments last June that safety and health is the "first priority" with weapons production "second unto that?"

Answer: In Secretary of Energy Notice 11, Admiral Watkins has stated as guiding principles to DOE personnel that "preserving our environment, protecting public health and safety, and assuring the Nation's security are primary DOE responsibilities." We will restart the defense production reactors and resume operations at Rocky Flats only after safety of operations can be assured, and health and environmental requirements have been addressed. Deputy Secretary Moore's comments last June reflect these principles and are still valid.

GAO Recommendations

Question: The General Accounting Office (GAO) has stated that if DOE's top priority is to minimize safety threats to Denver Area residents, then DOE should not reconstruct Building 371 at Rocky Flats. In light of your expressed commitment to health and safety, how do you respond to (GAOs) recommendation?

Answer: DOE is considering relocation of operations currently conducted at Rocky Flats. However, any relocation will take many years to complete. During that period, plutonium recovery processing is needed to support the President's Nuclear Weapons Stockpile Memorandum and to reduce the backlog of accumulated residues stored on the site. PRMP will fully comply with the latest DOE standards, thus providing the lowest risk processing as compared with existing buildings. Also, PRMP has the capability to eliminate the backlog, whereas the existing buildings cannot process most of the residue types. A decision to discontinue processing at Rocky Flats would require shipping over *Deleted* of backlog residues to another site, with shipping itself presenting a risk to the general public. We believe that processing residues at the point of origin -- in Building 371 -- is the most sound, safe and secure approach.

Building 371 and Retirements

Question: Is Building 371 necessary to dismantle warheads retired under agreements such as START? If yes, please describe the precise role of the facility in this process. Can any other existing DOE facilities (i.e., the upgraded recycling facility at Savannah River) be used for this purpose?

Answer: Part of the upgraded Building 371 mission will be processing site returns--retired weapons components from the stockpile. Building 371 processes will remove the plutonium from the assembly, remove the americium from the plutonium, purify the plutonium to remove in-grown uranium from radioactive decay and any other contaminants, and provide the plutonium button to the foundry for re-use in a weapon. All of the residues generated from each of its processing steps, as well as residues produced during machining operations, will also be processed in Building 371. Building 776 at Rocky Flats and New Special Recovery (NSR) at the Savannah River Site are the only facilities that are capable of processing site returns. The NSR is only able to process certain weapon types, and only at very limited rates, without upgrading of their facilities--but not more than about half of the site return mission, without a project of the magnitude of PRMP. Building 776 is over 35 years old and cannot continue to be utilized much longer without significant upgrades to improve its safety and reliability. Evaluations have shown it to be much more cost effective to move the function to an upgraded Building 371. The major DOE support for processing retired components, and thus any START agreements, will come from an upgraded Building 371.

AEDA Programs for FY 1991, Savannah River

Question: Does the Department plan to comply with the Clean Water Act and complete construction of the cooling tower for K Reactor at Savannah River?

If yes, what is the revised restart date for the reactor? Has DOE considered restarting either the L or P Reactors prior to K Reactor in order to both comply with Federal environmental law and minimize delays in tritium production?

If no, will DOE be seeking a Presidential exemption from the Clean Water Act? Has DOE considered restarting either the L or P Reactors prior to K Reactor in order to both comply with Federal environmental law and minimize delays in tritium production?

Answer: Yes, the Department does plan to complete construction of the cooling tower for K Reactor at the Savannah River Site and comply with the Clean Water Act. The design of the planned cooling tower is intended to protect indigenous aquatic populations onsite, in keeping with the Clean Water Act. A contract for design and construction of a natural draft cooling tower was awarded in October 1989. Design efforts are approximately 55 percent complete at this time. The tower site has been cleared, and excavation work is in progress. The subsoil grouting required to provide a firm foundation for the tower has already been completed. Project completion is scheduled for December 1992 to support operation of the K Reactor.

The K Reactor will be operated under the provisions of a consent agreement between the State of South Carolina Department of Health and Environmental Control which allows continued operation of the K Reactor without thermal mitigation until December 31, 1992. It is projected that, subject to completion of the Environmental Impact Statement, the K Reactor will be restarted for low power testing in December 1990. Following the low power testing to verify proper operation of the reactor, power operations could begin as early as late December 1990 or early January 1991. In determining the order in which the three reactors would restart, the Department considered many factors and concluded for technical reasons and programmatic reasons that the K Reactor should be restarted first, followed by the P Reactor and then the L Reactor.

FY 1990 Reprogramming

Question: In the DOE FY 1990 Omnibus Reprogramming Request, you list under "Sources of Funding" 5 separate safety and environmental construction projects:

90-D-150	Reactor Safety Assurance
89-D-148	Improved Reactor Confinement
89-D-140	Additional Separations Safeguards
89-D-153	Additional Reactor Safeguards
89-D-143	L Reactor Lake Upgrade

--Are these projects being cancelled or merely deferred?

Answer: The Department has no plans to cancel or defer any of these projects. In the first four cases, the funding identified for transfer to other Savannah River Site activities is available from scope changes, ongoing reevaluations that have delayed activities, and slower than anticipated project spendouts. In the case of the L Reactor Upgrade, the project was completed below estimate; therefore, the funds can be reprogrammed without penalty.

Question: How does each relate to restart plans for the Savannah River reactors? If these programs were not cancelled/deferred would their completion create a significant delay in the restart schedule?

Answer: These projects are not required for reactor restart; therefore, the reprogramming has no impact on the reactor restart schedule. The large magnitude of effort being put forth on reactor restart has, however, contributed to the delays that have occurred on the Additional Reactor Safeguards Project.

Question: Please describe each of these projects and explain how you justify their cancellation/deferral in light of your commitment to improving health and safety at the weapons production complex. How does DOE propose to allocate the $12.9 million "saved" by defunding these programs?

Answer: Project 90-D-150, Reactor Safety Assurance Program, is a multi-phased effort that encompasses changes which will protect against the occurrence of a postulated loss of coolant accident or mitigate the impact of a loss of coolant accident should it occur. Two changes have occurred to reduce the scope of this line item. First, the original scope of this project specified the purchase of three 600 kilowatt diesel generators. The new scope deletes this requirement because diesel generators purchased under another project had adequate capacity to power the loads identified by the original scope. Second, the original scope specified replacement of the starter motor contactor, internal factory and field wiring, and instrumentation. These items have been found to be in good condition thereby making replacement unnecessary at this time.

Project 89-D-148, Improved Reactor Confinement System, will provide improved capability to cope with the postulated heat loads in the reactor room in the highly unlikely event of a severe core melt at the P Reactor. The project was to have added a spray system to the reactor building to remove radionuclides and particulates from the reactor process room and reduce temperature and pressure in the event of a loss-of-coolant accident. This approach has been placed on hold pending the results of a cost benefit analysis. A reduction in scope and cost is expected to result from these studies.

Project 89-D-140, Additional Separations Safeguards, provides early detection and assessment of an outside adversary attempting to breach a material access area located in each canyon building. Design efforts have been slowed by a decision to relocate the intrusion detection and assessment zone. This change provides a much more effective security system but temporarily reduces the project's spendout rate.

Project 88-D-153, Additional Reactor Safeguards, will upgrade existing security systems and provide additional intrusion detection, alarm assessment, access control, and barrier delay capability in P, K, and L Reactors. Construction was to have been completed by September 1991; however, this schedule has been impacted by reactor restart modifications.

Project 81-D-143, L Reactor Upgrade, provided thermal mitigation for reactor cooling water discharges. This project was completed below cost.

None of these line items is being cancelled or deferred, rather funding is being stretched out until it is really required. The funding being made available will support priority reactor restart activities at the Savannah River Site.

Laboratory Consolidation

Question: Is DOE presently studying plans to consolidate the Lawrence Livermore and Los Alamos National Laboratories at one site? Would consolidation of the labs save a significant amount of money and, if so, approximately how much?

Answer: The Modernization Study submitted to Congress in January 1989 (2010 Report) found that consolidation of the national weapons laboratories would not be cost effective. Instead, it would be counterproductive by limiting the technology base and by eliminating the benefits of peer review and competition of ideas and designs.

The Modernization Review Committee has been appointed to review the findings and recommendations of the "2010 Report" along with the basic assumptions that underlie the report. They will report to the Secretary later this year with their recommendations for the modernization plan.

Idaho National Engineering Laboratory

Question: What is the present status of the Idaho Chemical Processing Plant? What actions are necessary to bring this facility into compliance with existing environmental laws? How much will this cost? What is the projected restart date for the plant?

Answer: The Idaho Chemical Processing Plant is not currently operating while the facility is undergoing an environmental compliance assessment. The Department of Energy's Idaho Operations Office initiated this shutdown and review of their compliance status and subsequently received a Notice of Noncompliance from the Environmental Protection Agency, Region 10. The actions required to bring the facility into compliance with existing environmental laws include the actions which will be part of a Consent Order as a result of the Notice of Noncompliance. It is also hoped that a Federal Facilities Compliance Agreement can be established between DOE Idaho and its regulators, and this may also result in additional corrective actions. Currently, the work necessary to bring the facility into compliance is being accomplished under existing budgets; however, since corrective actions are being identified as an ongoing process, additional funds may still be needed. It is hoped that the Consent Order can be signed by the end of June 1990, and at that time any additional corrective actions would be known and their costs will be assessed. The projected restart date for the plant is the August to September 1990 timeframe.

Feed Materials Production Center (FMPC)

Question: What is the present status of the FMPC?

Answer: Production of depleted uranium at the Feed Materials Production Center in Fernald, Ohio, has been suspended since July 1989 to concentrate efforts on safety improvements and site cleanup. The primary activities at the plant now consist of efforts to comply with current environmental, safety, and health requirements.

The Department of Energy's goal is to phase out depleted uranium production operations at the Feed Materials Production Center in favor of procurement of the material from the private sector. An accelerated program is currently underway for the qualification of commercial depleted uranium suppliers for the Y-12 and Rocky Flats programs. Y-12 received limited depleted uranium metal from vendors in February 1990 and will conduct evaluations through September 1990 to determine whether material specifications can be met. The current schedule calls for delivery of production quantities of depleted uranium metal from vendors in December 1990 and the depleted uranium production facilities at Fernald are being maintained in standby pending the successful completion of this vendor qualification program. The Senate and House Armed Services Committees requested that DOE submit a plan for the transition of depleted uranium production to commercial vendors and the plan is being finalized now.

Defense Programs is currently developing a strategy leading to the closure of the Feed Materials Production Center including plans for ensuring ultimate disposition of the materials currently onsite, achieving and maintaining compliance with regulatory requirements, and conducting remedial actions and decontamination and decommissioning activities. The FY 1990 budget for Fernald is $206.9 million with the Defense Programs amount totaling $124.6 million and Environmental Restoration and Waste Management amount totaling $82.3 million.

Question: Please explain why funds are being reallocated from a health and safety project at Lawrence Livermore laboratory to fund the settlement from the lawsuit by Fernald area residents.

Answer: In December 1989, the Department of Justice advised the Department of Energy that it should proceed to carry out the Fernald lawsuit settlement. The Department proposed to satisfy this obligation in three payments. On February 13, 1990 the Department notified Congress that the first installment would come from a reprogramming from Project 86-D-103, Decontamination and Waste Treatment Facility at Lawrence Livermore National Laboratory.

The funds from this project became available as a result of unanticipated delays in preparation of an Environmental Impact Statement and the reduction in scope of the project to remove a proposed waste incinerator. The combination of these action made funding available for the settlement of the Fernald litigation.

Question: How will this action affect health and safety at Livermore Lab?

Answer: The action taken to reprogram funds from Project 86-D-103 at Lawrence Livermore National Laboratory will have no adverse impact on the health and safety of the workers or surrounding community around the laboratory.

Tritium Requirements

Question: How much tritium has been recovered through voluntary planned retirements of weapons?

Answer: During FY 1989, about *Deleted* of tritium were returned to the Department of Energy from the Department of Defense retired systems. By the end of FY 1990, an additional *Deleted* of retirements are expected.

Question: How much tritium currently exists in the U.S. arsenal and how long can the present halt in tritium production continue before it is necessary to retire involuntary any weapons solely for the purpose of keeping others at full strength?

Answer: The United States currently has about *Deleted* of tritium inventory. Without tritium production, this inventory is predicted to last *Deleted* before shortfalls will impact the currently planned weapons stockpile. However, it is important to understand that this does not mean the Savannah River reactors do not need to resume operations until January 1992. It will be about 9 months after restart of the Savannah River reactors at 50 percent power before a partial discharge of newly produced tritium is available to meet stockpile requirements.

Question: What are the nation's future tritium production needs if our weapons stockpile continues at its present size?

Answer: If the weapons stockpile continues at about its present size, the Nation's tritium production must average *Deleted* *Deleted* a year to meet the currently forecasted base requirements. The remaining reactor capacity is required to restore working inventory and establish a prudent reserve as quickly as possible.

Question: What are the nation's future tritium production needs if our weapons stockpile is reduced by the accelerated retirement of older weapons, now slated for retirement?

Answer: Accelerating retirements could significantly reduce near-term tritium production requirements under the additional assumption that the currently planned build schedule would go unchanged. However, in the long-term, there would be a lesser impact as the same amount of tritium would be available from these systems only over a longer time period. Without a particular retirement schedule, it is not possible to quantitatively predict that impact on future tritium production needs of such a scenario.

Question: What are the nation's future tritium production needs if a portion of the tactical weapons in Europe are retired?

Answer: In general, additional retirements will reduce the future tritium production requirements provided that the new build schedule remains unchanged. However, without a particular retirement schedule, it is not possible to quantify the impact on future production needs under such a scenario.

Question: What are the nation's future tritium production needs if a START treaty is successfully concluded as expected?

Answer: It is not possible to quantify an answer to this question without knowing which and how many of the strategic weapons would be included in a START treaty and making explicit assumptions on the schedule for dismantlement and availability of the tritium contained in these weapons. Even without these particulars, it is safe to assume that the Nation's future production needs would be reduced in the event of a START treaty.

Question: What are the nation's future tritium production needs if there are further negotiated arms reductions beyond START -- for example, an actual 50% reduction in the total number of warheads -- strategic and tactical -- in our current nuclear arsenal, or even deeper cuts?

Answer: Requirements are roughly proportional to the size of the nuclear weapons stockpile. If each system in the stockpile is reduced by 50 percent, the average annual requirements would decrease proportionally. For some initial period, new tritium production requirements would be further reduced or possibly even eliminated as requirements could be met using the tritium obtained from these retirements. It is not possible to quantify the answer to this question without knowing which and how many weapons would be included in a negotiated reduction in the total number of warheads. The magnitude of the reduction would be dependent on the particular scenario postulated.

Question: Regarding possible restart of the Savannah River Site reactors, when will the Department of Energy submit to Congress its plans for restart of the reactors?

Answer: The projected schedule for restarting the SRS Reactors calls for restarting the K Reactor for low power testing in December 1990. Following low power operation for testing to verify proper operation of the reactor, power operations could begin as early as late December 1990 or early January 1991. The P Reactor will be ready for restart for low power testing in March 1991, with power operations in April 1991; and the L Reactor will be ready for low power testing in September 1991, with power operations in October 1991. These projected schedules are subject to completion of an Environmental Impact Statement now being prepared. The draft EIS was issued on May 4, 1990, and public hearings will be held. All public comments will be considered in preparing the final version of the EIS. A final decision on a restart and the date of such a restart will only be made until this process is complete. The details of the plan to restart the SRS reactors are contained in a document prepared by the Westinghouse Savannah River Company titled the Reactor Operations Management Plan (ROMP). The ROMP can be made available to you or your staff upon request. The Defense Nuclear Facilities Safety Board has been briefed on and is reviewing the reactor restart plans and schedules.

Question: What is the current assessment of risk in restarting the Savannah River reactors; what is the current projection of how long the reactors could be safely operated if they are restarted?

Answer: Through extensive analysis and evaluation, the Department believes that most of the significant technical issues, which could potentially delay restarting the SRS reactors, have been identified and are being adequately resolved. However, because the work of evaluating the restart effort is not yet complete, there remains the potential that previously unknown issues could be identified which might impact the projected restart dates. There will also be a pre-operational test program that could potentially identify technical problems requiring resolution. Operator training and qualification is another area that will contain some uncertainty until assessments which are ongoing and planned for the future are completed. Other areas of potential vulnerability include completion of the Environmental Impact Statement and the outcome expected litigation related to one or more of the SRS reactors. Once the first reactor is restarted successfully, then there can be high confidence that the remaining two reactors can be restarted successfully. The Department projects that the SRS reactors will be capable of producing the needed nuclear materials safely and reliably until new production capacity is available in the late 1990s or early 2000s.

Question: If the reactors at Savannah River Plant cannot be restarted for safety reasons, what are the Department of Energy's contingency plans? Specifically, what is the contingency plan for producing new tritium?

Answer: The Department of Energy, in cooperation with the Department of Defense. has developed contingency plans in response to *Deleted* The Department of Defense looked at alternate force structures, and the Department of Energy looked at alternate tritium supply sources. Restart of the N Reactor, which would take at least 3 years from a decision to restart, was the principal alternative to operation of the Savannah River Plant reactor.

Question: What is the contingency plan for stretching out the existing tritium stockpile?

Answer: In the event of a prolonged delay in the restart of the Savannah River reactors, the Department of Energy's working inventory will be reduced to minimum levels. Once this minimum level is reached, the Department of Defense and DOE would work to implement contingency changes to the nuclear weapons stockpile which have the least adverse affect on national defense.

Deleted

Question: What are the relative merits of alternative materials-production technologies? This evaluation should examine both reactor and non-reactor technologies (including the linear accelerator) and should consider safety, environmental, non-proliferation, economic, national-security and reliability factors.

Answer: In 1988 the Department undertook a careful and thorough examination of available technologies to determine the best approach for providing new production capacity. The Energy Research Advisory Board (ERAB), a standing independent advisory committee to the Secretary, conducted a review and assessment of various technologies including: heavy water reactor; modular high temperature gas-cooled reactor; light water reactor; liquid metal reactor; and linear accelerators. These technologies were evaluated by the ERAB using various criteria such as, technology base, safety and environmental requirements, project schedule, technical risks, costs, industrial base, and institutional acceptability. Based upon this analysis and review, the Department selected its preferred acquisition strategy.

The ERAB reported in July 1988, that for the HWR the tritium and plutonium production technology, fuel cycle facilities, waste system, and operational support infrastructure are fully developed at Savannah River and have generally operated well. Also, the low temperature and pressure operation of HWRs simplifies the reactor engineering. The preoperational and capital costs of a HWR facility sited at Savannah River would be reduced because auxiliary facilities are already in place. Finally, there is good confidence in the cost estimates based on HWR and relevant LWR experience, and on tritium production experience.

For the MHTGR, the modular design provides flexibility for phased expansion and assignment of individual units to special production tasks, and could generate improved power revenues because a portion of the energy could be considered firm. Also, target technology development is at an advanced stage, and could be qualified in a research reactor. Small modular units with inherent safety features, including passive decay heat removal, offer a potentially significant advancement in safety over current commercial reactors and improve the potential for a successful safety review. Fuel and target microspheres also serve as the containment for tritium and fission products.

For the LWR, ERAB reported that the reactor technology, fuel technology, and safety review methodology are established and well understood based on commercial power reactor applications. Commercial operating experience and experience with construction and startup schedules is extensive and varies widely. There would be good confidence in the NPR construction and safety review schedule if the commercial experience is used properly. Also, cost estimates are of moderate confidence based on commercial power plant experience and there is a large industrial infrastructure supporting the LWR. A LWR tritium target, however, has not been fully

Reactor Shutdown

Question: What other policy options are available to the United States, including the option of keeping the production reactors shut down if the Soviet Union shuts down its production reactors, subject to verification by on-site inspection and continued negotiated cuts in both arsenals?

Answer: National security policy for the Administration is set by the Department of Defense and the National Security Council. DOE only provides technical information in specific areas as requested. While we certainly agree that negotiations for reductions in nuclear weapons should continue, DOE is not in a position to discuss the Administration's policy options.

QUESTIONS SUBMITTED BY SENATOR HATFIELD

N Reactor

Question: Has the Department completed, in its entirety, the scheduled "Dry Lay Up" of the N-Reactor at Hanford, Washington, so the fuel core has been removed, and the water and pressure have been removed from the pipes?

Answer: Efforts to place the N Reactor at Hanford in dry layup resumed in October 1989. To date all fuel has been removed from the N Reactor core and from the N Reactor fuel storage basin, and all major systems have been drained with dryout in progress. Most of the N Reactor dry standby work will be completed by the end of FY 1990, although some activities will take longer, such as emptying the water and cleaning the N Reactor fuel storage basin. Overall cold standby status will not be completely achieved until all the irradiated N Reactor fuel has been removed from the K-East and K-West reactor fuel storage basins and those basins have been emptied of water and cleaned.

Question: What funding level is included in your FY 1991 request to keep the N Reactor in this "lay up" status?

Answer: Approximately $41 million is included in the FY 1991 budget request for N Reactor standby activities, including fuel handling operations at the K-East and K-West reactor fuel storage basins.

Question: At the time DOE announced termination of the N Reactor, some work was to be conducted on a "restart manual" in the event the facility was needed for national security purposes. Is that work completed, and if not, are any funds included in DOE's FY 1991 budget for this purpose?

Answer: At the time N Reactor was directed to a standby condition, limited contingency planning was in progress. Identification of top level requirements was completed in FY 1989 to determine the sequence of events and actions necessary for a tritium contingency program, reactor restart, or plant termination. A "Restart Manual" was not developed, and no funding is included in DOE's FY 1991 budget for this purpose or for any contingency planning.

PUREX Processing Facility

Question: While the N Reactor has been closed, the PUREX processing facility at Hanford remains and is considered part of the DOE weapons production complex. What was the event at that facility last year which led to its mysterious closure? Why were the States and Congress not notified at the time of its closure? Is it now operating?

Answer: The PUREX Plant was taken out of service in December 1988 because a limiting condition of operations was exceeded. Normally the plant operations would have been continued after a short outage, following actions to correct the cause of a shutdown. In this case during the shutdown, a major component had to be replaced requiring that the plant remain shut down for several months. Following the replacement of this component, a potential RCRA listed waste issue was raised requiring several additional months of downtime while effluent piping modifications were made. The outages were normal interruptions of processing operations that required no notification to Congress or the State of Washington. The PUREX plant recently completed a stablization run and is currently in an extended maintenance outage. During this outage, modifications will be made to assure environmental compliance requirements are met with respect to the discharge of process water from future PUREX operations.

Question: Am I correct that PUREX is scheduled to remain in operation in order to process the remaining fuel materials left over from the N-Reactor core? How long will that take? and, during this process, does PUREX manufacture nuclear materials that are used to meet your DOD stockpile requirements? Are any of the nuclear materials produced by PUREX a substitute for materials that cannot now be manufactured because of the closure of the Savannah River Plants?

Answer: After completion of compliance actions related to the treatment of liquid effluent during the current maintenance outage, a decision to resume PUREX operations is expected in December 1990. Our plans are to conduct a campaign to process the remaining N Reactor weapon-grade fuel at that time. Of the approximately Deleted Deleted of N Reactor irradiated spent fuel stored in basins at Hanford, approximately Deleted contain weapon-grade plutonium. In this regard, materials recovered through PUREX are not a substitute for materials that might be produced at the Savannah River Site. It will take about 6 months of PUREX operation to recover the weapon-grade material and, subsequently, the Plutonium Finishing Plant would require another year to convert this material to metal.

The Savannah River reactors, were they operating, would not be producing any additional plutonium at this time as current stockpile requirements do not require new plutonium. In this regard, materials recovered through PUREX are not a substitute for materials that might be produced at Savannah River. However, there remains a requirement for plutonium to meet weapons requirements. This will be accomplished through recovery of plutonium from processing previously irradiated targets such as the N Reactor fuel at Hanford, residue backlogs and weapons returns, as well as the processing of currently generated residues at plutonium facilities across the complex.

Question: Governor Boothe Gardner of Washington State has raised a number of questions as to whether the PUREX Plant is in fact required to process some of the on-site waste existing at Hanford. Also, in light of DOE's decision not to proceed with the S.I.S.

(Special Isotope Separation) project in Idaho, there is further question regarding the real need for the PUREX facility. My question is this: Is the Department actively seeking further missions for the PUREX facility once it has completed processing of the remaining N-Reactor fuel? or more specifically, when can we look forward to the PUREX Plant closing down, permanently?

Answer: The decision not to construct the SIS facility at this time reflects that existing stockpiles of weapons-grade plutonium are sufficient to meet needs in the foreseeable future. There remains a need to process supplies of weapons-grade plutonium into forms suitable for weapons requirements. This will be accomplished through recovery of plutonium from previously irradiated targets, residue backlogs, and weapons returns, as well as the processing of currently generated residues at plutonium facilities across the complex.

Specifically, in regard to the PUREX Plant at Hanford, the Department is currently storing about of N Reactor irradiated spent fuel, approximately *Deleted* of which contain weapon-grade material. Such storage was originally intended as an interim step toward the reprocessing and recovery of nuclear materials. Long-term storage in this mode was not envisioned and does pose an environmental risk due to deterioration of the spent fuel and the basins themselves. Operating PUREX to clean out the fuel storage basins would improve the safety posture at the site. This would require the PUREX Plant to operate about 5 years. The Department is investigating other means of dispensing with the irradiated spent reactor fuel. Preliminary studies indicate that processing through PUREX is the most cost effective means of dispensing with this fuel. OMB has directed that additional cost studies be completed before submission of the FY 1992 budget. Additionally, reflective of the Department's intent to close the PUREX facility as soon as practicable, the FY 1991 budget assumes that the PUREX facility will be transferred to the Environmental Restoration and Waste Management program late in the fiscal year.

Allocation of NPR Construction Funding

Question: Of the $363 million proposed in FY91 for the NPR program, nearly $221.3 million is proposed for construction activities, of which a portion is assumed to be available for the HWR and MHTGR design teams which were selected in November 1989. Precisely how much of the $221.3 million for construction in FY91 will be available for each of the two design teams? Of any remaining construction funds NOT allocated to the design team contractors, please identify the laboratory, facility or contractor that will receive those funds and describe their activities in the NPR construction effort.

Answer: The Department has requested construction funds for the New Production Reactors program totalling $221.3M for FY 1991. Although they are called "construction" in the Department's accounting practices, these funds are for design only and nothing will actually be built in FY 1991. Each design team will be allocated approximately $82M or $164M total. The remaining $57.3M will be used primarily for Title I design support activities and construction management contractors. The major laboratories receiving funding include Argonne, Oak Ridge, Lawrence Livermore, and Sandia National Laboratories. Also, EG&G Idaho and the Westinghouse Savannah River Company will be participating in HWR and MHTGR Title I design activities. The major Title I design support activities for HWR are: Transient Fuel Performance; Core Neutronics; Thermal Hydraulics; Materials Systems Integrity; Safety/Quality Assurance/Environment Assessments and Reviews; Seismic Design; and Codes and Standards. The major Title I design support activities for MHTGR are: Reactor Physics; Integral Data Program; and Fuel and Target Fabrication Facility. Finally, construction management contractors for both technologies will be hired in the last quarter of the year for site interfaces and prioritizing construction work packages.

Preliminary Cost Estimates for Design and Construction

Question: Despite considerable work that has proceeded on the NPR program, the FY91 budget justification (Vol.1,pp.336) fails to include an updated estimate for the total construction cost of the project and instead states that a new estimate will be available at the conclusion of the conceptual design. However, according to the chart in Dr. Monetta's testimony, conceptual design is scheduled to be complete in early 1990. Please provide the committee an updated TEC at this time, including engineering and design for each of the two proposed technologies.

Answer: The preliminary total cost estimates developed for the NPR program were derived from proponent data provided to the Energy Research Advisory Board in July 1988. These are the current cost estimates until the conceptual designs are completed and evaluated in late summer 1990. The conceptual designs will provide the Department with budget quality cost and schedule estimates. Following the necessary reviews of the design data, the Department will furnish the committee with an updated TEC for the two preferred reactor technologies.

Dual Reactor Strategy

Question: What cost saving measures has the Department identified in either the design and engineering phase, or actual construction in the NPR program, in order to protect the "dual strategy" concept against potentially lethal cost increases?

Answer: The New Production Reactors (NPR) Program is establishing a strong program management system to ensure that costs, schedules, and quality goals are achieved. Sophisticated tracking systems will be used to monitor costs and to identify as early as possible any problems or issues that might cause deviations. NPR has chosen the approach of building safety, quality, and environmental considerations into every step of the acquisition process from initial design to construction to operation as one of the best ways of assuring that performance requirements are achieved at the least cost. The NPR program will be managed using the quality standards of NQA-1 and applicable DOE Orders. "Doing the job right the first time" has been shown to be one of the best approaches for managing life cycle costs.

To ensure that the program takes advantage of current knowledge as well as previous reactor operating experience, particularly in the area of reactor safety, the program is utilizing experts, right from the beginning, to advise management on all aspects of the new production reactor capacity. The program will draw upon the best available information from experts in a variety of fields such as nuclear engineering, reactor safety, environmental sciences, systems engineering, nuclear physics, and nuclear plant management. All key decisions or actions that could potentially impact program technical, safety and quality, and environmental requirements or performance will be thoroughly reviewed and evaluated prior to implementation or change. Through early inputs into key areas such as the performance of critical safety systems, the integrity and reliability of the reactor design are strengthened and future problems, delays, and cost increases are avoided. In these areas, no fewer than six separate groups will be used to oversee and review program activities in addition to the Federal, state, and local groups and the public that will take part in the NEPA process.

Additionally, NPR is utilizing proven technology and off-the-shelf components wherever possible. Technology transfer programs have been established to fully utilize the experience gained from the commercial Fort St. Vrain high-temperature gas-cooled reactor and the current heavy water reactors at Savannah River.

Wherever possible, competitive procurements will be utilized.

Light Water Target Development

Question: Just after Congress completed action on the FY90 Conference Report in September 1989, the Department increased the LWR target development program from about $4.7 million to nearly $23.5 million in FY90. At that time the Department stated this increase was necessary in order to protect the NPR EIS from a legal challenge on the basis that the LWR technology was a "reasonable alternative" which needed to be explored, lest a law suit be filed claiming that the EIS was insufficient.

Was a legal opinion prepared for the Secretary on the question of legal sufficiency of the EIS as it regards the LWR alternative? If not why? If one was prepared please provide a copy to the committee.

Please provide a list of the case law citations on this question which the department's legal counsel states is the justification for the decision to accelerate the LWR target development program.

Answer: The increase in funding was necessary to protect DOE's NEPA Program strategy for NPR but is not specifically relevant to protection of the EIS from legal challenge.

Because the NPR program is on an expeditious schedule, a decision was made to proceed in parallel with technology development for the reasonable reactor alternatives and the NEPA process leading to the EIS and Record of Decision. Consistent with NEPA case law (Maryland Conservation Council, Inc. v. Gilchrist, 808 F.2d 1039, 4th Circ. 1986) and C.E.Q. regulations, (40 CFR 1502.2(f) and 1506.1(a)(2)) the Department could proceed with this parallel track only if it did not, in the process, foreclose or prejudice any reasonable alternative. Failure to develop the light water target to the point of a feasibility determination while proceeding with the technology development and refinement for the MHTGR and HWR would, in this time-sensitive program, cause the LWR option (which was determined to be one of the reasonable technology alternatives for NPR) to be foreclosed or prejudiced at the time of the Record of Decision.

The Assistant General Counsel for Environment, who is responsible for advising the Department on environmental law, was involved in the development of the NEPA strategy for this Program, as is usual for most DOE programs.

Question: In addition to an agency legal opinion and case law on the matter of legal sufficiency of the NPR EIS, the results of the public scoping sessions, as published in the Department's December 1989 Implementation Plan, may provide guidance to the Department as to whether the LWR technology should be accelerated to a point of parity with the other two alternatives. Please identify those public comments or agency consultations, included in the December 1989 Implementation Plan, which suggested that information about the LWR technology might be inadequate to be considered a reasonable alternative.

Answer: The public scoping process yielded over 9,000 individual comments. We are in the process of reviewing these various comments to identify any comments that may have indicated that the LWR technology might be inadequate to be considered as a reasonable reactor alternative. This process will be completed shortly and we will forward our results to the committee.

Question: On January 1989, pursuant to Section 1435 (b) of the FY 1989 Defense Authorization Act, Secretary Herrington submitted to the Congress his report entitled "Actions to Shorten New Production Reactor Schedules", and on page 4 stated, "the 63% completion status of the WNP-1 precludes having the three concepts at a totally comparable level of maturity before the NEPA record of decision is reached." Yet, the Department now is arguing that case law and CEQ regulations dictate that all three technologies be considered in parity. Given that much of case law existed at the time this publication was presented to Congress, what subsequent information or interpretation compelled the Department to disregard this earlier statement to Congress and attempt to place the LWR option on an equal basis with the other two chosen alternatives?

Answer: The Department is proceeding to resolve technical issues with all three technologies so that at the time of completion of the NEPA process it will have developed sufficient information to determine the technical feasibility, cost and schedule for all three technologies. Parity of all information is not being sought. The information on technical feasibility, cost and schedule, as well as environmental impacts, needs to be considered by the Department at the time of Record of Decision; as described previously we may not before that time, prejudice or foreclose any reasonable alternative.

Light Water Target Development

Question: Pursuant to CEQ regulations entitled "National Environmental Policy Act Regulations; Incomplete or Unavailable Information" (40 CFR Part 1502.22), the Department is required to include incomplete information, such as that relating to the LWR target development, "if the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives..." Is this CEQ citation the basis for which DOE believes it must pursue the LWR target development on an accelerated basis prior to completion of Final EIS? If not, what is the appropriate CEQ citation DOE is using?

Answer: 40 CFR 1502.22 is not the section of the CEQ regulations applicable to the LWR target work. The applicable CEQ portions of the regulations relating to LWR target development are 40 CFR 1502(f) and 1506.1(a)(2). These sections of the regulations pertain to the Department's actions of proceeding with a parallel track of technology development for reasonable reactor alternatives and the NEPA process leading to the EIS and Record of Decision. The Department could proceed with this parallel track only if it did not, in the process, foreclose or prejudice any reasonable alternative.

Question: If the Department's justification for accelerating the LWR target development is to protect the Final EIS from potential legal challenge, why, according to the chart accompanying Dr. Monetta's testimony, is the Final EIS and Record of Decision scheduled to be released ALMOST A FULL YEAR BEFORE THE LWR TARGET DEVELOPMENT RESEARCH SCHEDULE IS COMPLETE?

Answer: The Department is diligently complying with the letter and spirit of NEPA in developing the EIS. As previously stated, DOE's objective with the LWR target work is to demonstrate feasibility of tritium targets in a Light Water Reactor environment by the time of the Record of Decision. The LWR target development is an element of the contingency activity related to NPR, and the developmental work has been on-going for a number of years. Completion of the LWR target development work will continue as a contingency activity until this target feasibility demonstration is complete.

Question: What is the total estimated cost for the LWR Target Development Program?

Answer: The original proponent estimate developed as part of the Energy Research Advisory Board study was $88M in 1988 dollars or $104M when escalated to year-of-expenditure dollars. NP is in the process of rebaselining the LWR Target Development Program in light of increased costs for irradiation tests in the Advanced Test Reactor. However, we do not expect the total cost, in year-of-expenditure dollars, to exceed the original estimate of $104M for this very important contingency program.

Question: Given recent attempts to smuggle nuclear-related devices into Pakistan, and recognizing the Secretary's decision to expand the agency's own intelligence capability to include"foreign intelligence" operations (see Tuck Statement pp. 16) why is the Department not MORE conscious about the obvious implications of converting a civilian nuclear power plant in to a weapons producing facility.

Answer: The Department is well aware of the policy considerations that would be involved in converting WNP-1 into a weapon's materials producing facility. The Department's preferred strategy is construction of a Heavy Water Reactor at the Savannah River Site and a Modular High Temperature Gas-Cooled Reactor plant at the Idaho National Engineering Laboratory.

It should be noted that to complete WNP-1 as a production facility would require substantial modification to the reactor internals and core to accomplish the production mission in a safe and environmentally begin manner. Thus, the reactor core would have a significantly different design configuration than a commercial power reactor.

Because a Light Water Reactor (LWR) is a reasonable alternative under the National Environmental Policy Act, this option is being considered in the Environmental Impact Statement. Thus, the New Production Reactor Program is continuing the engineering development work necessary to design a tritium target for a LWR.

Light Water Target Development

Question: In addition to an agency legal opinion and case law on the matter of legal sufficiency of the NPR EIS, the results of the public scopin sessions, as published in the Department's December 1989 Implementation Plan may provide guidance to the Department as to whether the LWR technology shou be accelerated to a point of parity with the other two alternatives. Please identify those public comments or agency consultations, included in the December 1989 Implementation Plan, which suggested that information about th LWR technology might be inadequate to be considered a reasonable alternative

Answer: The public scoping process yielded over 9,000 individual comments. The Office of New Production Reactors (NP) has completed their review of these various comments to identify any comments that may have indicated that the LWR technology might be inadequate to be considered as a reasonable reactor alternative. NP has compiled a listing of all comments pertaining to this subject.

QUESTIONS SUBMITTED BY SENATOR McCLURE

Acquisition Strategy

Question: In light of recent developments in the Soviet Union, does the Department still support the need to build two production reactors? Could we get along with one reactor while we see what progress is made in the arms reduction discussions?

Answer: Currently the United States is not producing tritium and the restart of the Savannah River reactors offers only an interim solution. The Soviet Union is still modernizing it's already strong strategic capability. The Department's preferred strategy of constructing two new reactor plants of different technologies at two sites is an issue of assured capacity. The Department remains committed to the strategy of duality which will provide a high degree of assurance that nuclear materials, primarily tritium, will be reliably produced in a safe, secure and environmentally sound manner and in adequate amounts to meet national security needs well into the next century.

Question: What are the most significant issues confronting the New Production Reactor program in FY 1991?

Answer: The Department has been proceeding with a preferred strategy for acquiring the needed new production reactor capacity based upon the Energy Research Advisory Board report of July 1988. I believe the most significant issue confronting this program in FY 1991 is preserving the integrity of the program--that we be allowed to continue pursuing the preferred strategy outlined in the August 8, 1988 Report to Congress. That means enabling us to continue with the environmental impact statement in parallel with preliminary design and confirmatory development activities in order to provide the necessary data to make sound choices and decisions about the preferred technologies and sites at the Record of Decision at the end of 1991.

Testing of Plutonium at SIS

Question: In addition to providing the cost figure for testing of plutonium, please advise if cost is the determining factor in the decision to not test plutonium?

Answer: Based on a careful evaluation of alternatives, the Department proposes to complete the technology verifications in the Engineering Demonstration System at the Lawrence Livermore National Laboratory using non-hazardous and essentially non-radioactive surrogate materials in lieu of plutonium, as previously proposed. At the time this decision was being made, the incremental cost of conducting verifications with plutonium over and above the current request for completion of development with surrogate materials was $10.7 million in FY 1991 and $3.0 million in FY 1992. A detailed cost estimate for reinstatement of the Plutonium Performance Verification Series at this juncture has not been quantified but would certainly entail significantly greater cost and schedule impacts without commensurate program benefits.

The Lawrence Livermore National Laboratory has achieved excellent test results to date based on integrated system runs using non-hazardous materials in lieu of plutonium. Although cost is a significant factor, the success achieved to date contributed to the Department's proposal to complete the development program in the Engineering Demonstration System facility without the use of plutonium. This proposal expedites completion of development in a timely and cost-effective manner without the additional risk and decontamination costs imposed by the introduction of plutonium. The Department is confident that this proposal will maintain a viable option to deploy the technology at a future date without substantial additional development on a schedule responsive to a postulated national security scenario.

Question: Has the Department considered what it would cost to not test plutonium at this time when the facility is set up and the team is intact?

Answer: There are no additional costs due to not performing plutonium testing at this time. However, the disadvantage and therefore the opportunity cost of not performing verification tests with plutonium at this juncture is an acceptable degree of increased technical risk if the future restart option is exercised.

However, based on test results achieved to date and anticipated in the future, utilizing only surrogate materials, the Department is confident that this cost effective and logical course of action maintains a viable deployment restart option while avoiding a more extended and costly schedule and the additional risk and decontamination costs associated with plutonium verifications.

QUESTIONS SUBMITTED BY SENATOR DOMENICI

Atomic Energy Defense - Verification and Control Technology

Question: Mr. Alessi, in your statement you highlight that DOE has expanded its traditional role in the nuclear testing area to include arms control negotiations. As you note, the United States has major negotiations underway in all areas of arms control, and DOE is involved in these initiatives. I must express my concern, however, that the FY 1991 budget request of $174.0 million for verification and control technology seems to fall significantly short of the funding that could be used in support of these arms control initiatives.

I note that in each of the past three years, the Congress has taken the initiative to augment the budget requests for verification and control technology activities at DOE. In FY 1988, Congress ~~provided an additional $20.5 million~~ for this program; in FY 1989, Congress added $15.0 million to the budget request; and for FY 1990, Congress added $20 million.

Could you provide for the record the details of where augmentations to the budget requests have been made in each of these three years?

Answer: In FY 1988, Detection Technology programs supported by the augmented funding included:

- conceptual design of sensors and instrumentation for the Boost Surveillance and Tracking System;
- development of means to improve the sensitivity and reduce the error range for the CORRTEX yield measurement technology for onsite verification of the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty;
- fabrication of the initial Deployable Seismic Verification System units.

In FY 1989 and FY 1990, programs supported by the augmentation covered a broad range of verification activities including development of improved detection/inspection techniques for monitoring mobile launchers, nuclear warheads, production of special nuclear materials, reduced thresholds for nuclear explosive tests, chemical weapons, and conventional force reductions.

In specific technology developments, we:

Deleted

Question: While I commend the Administration for supporting the development of a Center for National Security and Arms Control Sandia National Laboratories as a central focus for these activities, I don't believe the budget request adequately supports ongoing arms control negotiations, which have taken on increasing urgency with the astonishing collapse of communist governments through east central Europe.

What is DOE's rationale for the FY 1991 verification and control technology budget request, which actually falls below the FY 1990 enacted level for operating expenses and stays approximately level for capital equipment?

Answer: Arms Control is an important aspect of U.S. national security. Nonetheless, the competition between arms control verification; compelling production facility modernization; and environmental, safety, and health demands on Defense Programs' resources resulted in painful choices.

Question: Does DOE's request adequately support investment in long-range R&D to support new verification technology in view of the rapid modernization of the Soviet nuclear force?

Answer: Due to budget constraints, the FY 1991 budget continues long-term R&D, but at a reduced level. Specifically, there is $115 million in FY 1990 and $104 million in FY 1991. The FY 1991 Detection Technology budget request will not provide for comprehensive and timely development of verification technologies for START, Chemical Warfare Convention, Conventional Forces in Europe and Open Skies Treaty. In the event verification of dismantlement or destruction of treaty limited warheads is required, or the monitoring of special nuclear material production is required, the FY 1991 Detection Technology budget request will not provide for the adequate development of the verification technologies.

Question: One area that I feel certain will require continued attention is detection technology as the United States and Soviet Union move toward major arms control agreements. Yet, the FY 1991 budget request is essentially at the FY 1989 funding level of just over $32 million. How does the Administration justify this budget request in view of increasing progress towards major arms control agreements?

Answer: Funding appropriated for Detection Technology in FY 1989 was $110.8 million, and the FY 1991 budget request is $103.6 million. I assume the $32 million you refer to is the Detection Technology funding allocated to Los Alamos National Laboratory (LANL) in FY 1989 and planned for FY 1991. Even though the overall budget for this activity is lower in FY 1991, the percentage to LANL is increased.

Atomic Energy Defense - Tech Transfer

Question: Mr. Chairman, last year the Congress enacted a bill which I pressed then, and I continue to press now. That bill was the National Competitiveness Technology Transfer Act that was adopted as part of the FY 1990 Defense Authorization Act.

I am pleased to say that the Secretary of Energy has made a strong commitment to implementing the policies embodied in the bill, and that we are seeing promising collaboration with other Federal agencies, most notably the Department of Commerce. The Federal government is launching an initiative which I believe makes the valuable scientific talent and resources of our national laboratories available to the private sector to help promote America's competitiveness in world markets.

May I say I count on the continued strong support of the Department of Energy, and aggressive action by the Administration, to make this initiative a success. A great potential is there, and we have passed it up for far too long. It is time to be on the move.

As I understand the FY 1991 budget request, the Administration has requested $10 million for the technology commercialization initiative. While this is $9 million above the FY 1990 funding level, I am concerned that the funding is requested in the military applications R&D budget rather than in the Defense Programs budget where these activities have had their genesis. I frankly see no rationale for putting these funds in the weapons R&D budget.

I would hope that the Chairman and Ranking Member will concur that these funds should be restored to the Defense Programs budget as a specific line-item to ensure that appropriated funds are specifically used for this purpose, and that the progress made on technology transfer initiatives is aggressively continued. Every indication I have is that Defense Programs have laid the very careful and thorough groundwork to implement this initiative. I believe they have the necessary expertise to successfully advance this initiative.

To begin this discussion, would you tell the Subcommittee what role the Defense Programs organization has in the implementation of the National Competitiveness Technology Transfer Act of 1989?

Answer: The National Competitiveness Technology Transfer Act of 1989 (Title XXXI, Part C of the National Defense Authorization Act for Fiscal Years 1990 and 1991, Public Law Number 101-189 dated November 29, 1989) amended the Stevenson-Wydler Technology Innovation Act of 1980 to make it applicable to government-owned, contractor-operated laboratories, including the Defense Programs laboratories. Public Law 101-189 also amended Section 91a of the Atomic Energy Act of 1954, as amended, to officially clarify that technology transfer is a mission of Defense Programs (DP). Over the past year, DP has been working with all elements of the nuclear weapons complex to aggressively pursue the development of guidelines and procedures to govern activities conducted under the new DP technology transfer initiative. This initial DP effort has formed the nucleus for the current effort to develop, on a DOE-wide basis, implementing procedures for the 1989 Act. The Office of Classification and Technology Policy (OCTP), within Defense Programs, has played a key role in working with other departmental elements to develop technology transfer policies and guidelines. OCTP was instrumental in the establishment of the current DOE-wide task force established by Deputy Secretary W. Henson Moore on January 31, 1990. OCTP has partially funded this effort with the Albuquerque Operations Office (a principal DP field office) playing a lead role. With the proper level of support, this effort can help to assure that all elements of the Department take full advantage of the additional authorities contained in that Act.

With regard to the concern about the inclusion of funding for the DP technology initiative within the Military Application R&D budget, we agree with the Senator that technology transfer funds should be a specific line item. Proper fiscal control of the new DP technology initiative requires the direct control over funds by the same organization responsible for the transfer. You can be assured that DP management fully supports the initiative and that the

$10 million budgeted for FY 1991 will be used exclusively for that program regardless of its location in the DOE budget. In order to assure visibility and certainty for DP technology transfer activities, OCTP has requested implementation of appropriate mechanisms so that these funds will be managed by OCTP for technology transfer at the beginning of FY 1991.

Question: You well know that DOE is not the only Federal agency or program that has missions and programs in technology transfer. What coordinating efforts are you taking to learn from, and to cooperate with, other Federal agencies involved in these activities?

Answer: We have had many discussions with personnel from other Federal agencies which are actively engaged in technology transfer activities to learn more about their experiences. About 1 year ago, OCTP established a technology transfer steering group comprised of DOE and management and operating contractors from throughout the nuclear weapons complex including Los Alamos National Laboratory, Sandia National Laboratories, Lawrence Livermore National Laboratory and Idaho National Engineering Laboratory. In developing the new DP Technology Transfer Initiative, OCTP has built upon the knowledge gained from the experiences of other agencies and the knowledge of Steering Group representatives. A consensus direction for the new DP technology initiative was developed based on these activities. Attached is the charter for the new initiative developed by the Steering Group. The DP charter has been used as a starting point for the current DOE-wide effort to develop policy and guidelines for technology transfer. The entire nuclear weapons complex has concurred on this document as containing the basic elements of an aggressive program for technology transfer. To further assure proper coordination, DP is now undertaking an aggressive program of briefings on our initiative that will identify areas for greater coordination and possible collaboration with other Federal agencies. Plans are also being considered for the establishment of a senior level DP advisory board comprised of representatives from industry, academia, and other government agencies to provide guidance on the varied activities within DP's technology initiative.

From a DOE-wide perspective, all elements of the Department have been involved in two major initiatives related to technology transfer. The first is the technology transfer component of the National Energy Strategy. The second is the Department's implementation of the National Competitiveness Technology Transfer Act of 1989. For both of these initiatives, we have had the participation of other agencies including the Departments of Agriculture, Commerce, Defense, State, Treasury, NASA, the Office of Science and Technology Policy, OMB, the National Institutes of Health, and the U.S. Trade Representative. The Department works with these agencies through groups such as the Federal Coordinating Committee on Science, Engineering, and Technology and the Committee on Renewable Energy Commerce and Trade.

TECHNOLOGY TRANSFER CHARTER
FOR
DEFENSE PROGRAMS

June 21, 1989

PREAMBLE

- Technological advancement is a key component in the growth of the U.S. industrial economy and a strong industrial base is also an essential element of U.S. national security.

- Studies sponsored by industry and academia report convincing evidence of declining U.S. competitiveness in both domestic and international markets, despite America's lead in technology innovation. Some of these studies have also reported statistics indicating trends with long term consequences for U.S. competitiveness. These trends include lower rates of productivity among America's skilled laborers and decreasing interest and declining performance in scientific and technical disciplines among American students.

- Congress and the President have directed that programs be initiated to encourage and facilitate the transfer of federally funded technology to the private sector to enhance U.S. industrial competitiveness.

- The DP laboratories, test sites, and production facilities involved in national security activities possess capabilities in a broad range of advanced technologies covering the spectrum from basic research to precision production techniques. They also possess unique problem solving capabilities as well as a large pool of highly skilled scientists, engineers and technicians who could contribute substantially to our economic advancement.

- While basic research is still essential for continued, long-term advancement, innovation and the rapid application of new technology is assuming a more significant role in near-term, marketplace success.

- The governments of other industrialized countries, recognizing this change, have moved to encourage and facilitate their industry's rapid exploitation of technology for the development of new commercial products and processes.

- As a result, U.S. industry faces increasingly intense foreign competition which has challenged our economic position and impinged on our national security.

- The U.S. continues to devote more federal funds to the support of R&D than any other country. However, almost 70 percent of that effort currently supports military R&D. Over the last decade, military R&D has only incidentally yielded commercial spin-off technologies. We must find ways to better utilize this substantial investment of federal dollars and scientific manpower and increase its contribution to the technological advancement of our commercial sector.

- Improving commercial sector utilization of Federal R&D resources will entail modifying our practices, increasing our appreciation of industry's technology requirements and forging new linkages that facilitate technology flow. This flow need not and should not be unidirectional.

- An opportunity exists to use those resources residing in the DP facilities to promote technology commercialization while, at the same time, enhancing the primary national security mission. Cross-fertilization will increase our exposure to external technology which can accelerate innovation and increase efficiencies within DP facilities.

- An opportunity also exists to utilize the capabilities of the DP complex to enhance the skills of the U.S. labor force and the science and technology programs of our educational institutions.
- DOE and DP management have endorsed the establishment of a vigorous DP initiative in conjunction with the broader based Departmental program, to take advantage of these opportunities.

OBJECTIVE

To enhance U.S. national security by contributing to our industrial and technological base through programs which provide opportunities for:

- U.S. industry to utilize the technologies and capabilities residing in the DP complex.
- The U.S. labor force to upgrade and enhance its technical skills and capabilities in coordination with industry.
- The American educational system to increase technical literacy in this country and develop the skills of our next generation of scientists and engineers.

PRINCIPLES

- A vigorous technology transfer effort shall be complementary to and supportive of DP's primary national security mission.
- Technology transfer efforts shall be acknowledged as a primary activity in support of the mission of the DP complex and will be evaluated.
- Incentives should be provided to promote technology transfer related efforts.
- The Secretary of Energy has management authority and responsibility for the Technology Transfer Program.
- The DP Technology Transfer Program will build upon the decentralized DOE management structure and will capitalize on the unique relationships between DP and its management and operating contractors.
- DOE Headquarters maintains broad oversight and policy guidance; DOE field offices provide oversight, program coordination and approvals and the facility contractors conduct the technology transfer program.
- Activities will comply with applicable laws and regulations.
- Preference will be given so that the principal benefits resulting from the technology transfer efforts flow to the U.S.
- The DP Technology Transfer Program must be conducted in a manner that provides "fairness of opportunity".
- Industry participants will bear the costs of technology transfer activities commensurate with the benefits derived.
- Revenues derived from technology transfer activities will be fed back into the program to enhance the technology transfer effort.
- Speed and certainty in the decision making process are critical to success and must be assured.
- The DP Technology Transfer Program will delegate authority to the lowest appropriate level.

- Research results will continue to be broadly disseminated to further the advancement of science and encourage innovation.
- Both classified and unclassified sensitive information must continue to be fully protected.
- Procedures must be developed that include a DP oversight role to identify and withhold commercially valuable government information from public dissemination while, at the same time, assuring the continued free flow and use of this information within the DP complex and release of appropriate research results to the public.
- Procedures must be developed to protect proprietary industrial information.

APPROACH

- Inform the Secretary of Energy, Field Offices and facility heads of the DP technology transfer policy.
- Integrate this effort with the Office of Energy Research's ongoing R&D Laboratory Technology Transfer Program for the Department.
- Formalize mechanisms for coordination with other DP and DOE program offices
- Identify where laws or the interpretation of laws are in conflict with or inconsistent with program objectives, and propose appropriate remedies.
- Establish or amend necessary orders, guidelines and operating procedures to assure facility management and DOE that actions related to commercialization efforts are implemented in a timely, fair and consistent manner.
- Create the necessary infrastructure to implement the DP technology transfer effort.
- Develop mechanisms, such as a special account, to permit the revenues generated from technology transfer activities to be recycled to support additional activities and help sustain the effort.
- Develop criteria/procedures for selection and implementation of pilot projects.
- Utilize pilot projects to explore and test various mechanisms for increasing productive interactions among the weapons complex, U.S. industry, labor and educators.
- Develop evaluation criteria to measure the effectiveness of pilot projects.
- Monitor pilot projects and evaluate results to determine, under defined sets of circumstances, the most effective mechanisms for technology commercialization and prototype these for ongoing program implementation.
- Establish a vigorous outreach program to increase external awareness of the DP program, weapons complex capabilities, and access procedures.

PRINCIPLE NO. 1: A VIGOROUS TECHNOLOGY TRANSFER EFFORT SHALL BE COMPLEMENTARY TO AND SUPPORTIVE OF DP'S PRIMARY NATIONAL SECURITY MISSION.

COMMENTS:

- DP is responsible for development, production and maintenance of the U.S. nuclear weapons capability.
- This requires that the Weapons Complex must remain in the forefront of all areas of advanced technology and manufacturing capability that is applicable to nuclear weapons.
- The national security mission also encompasses the utilization of this advanced technological capability for the enhancement of U.S. non-nuclear, military capability to the extent requested by DOD and approved by DOE management.
- Technology transfer is not a new activity, but this initiative reflects a recognition of the increasing importance of the economic security component to our overall national security.

PRINCIPLE NO. 2: TECHNOLOGY TRANSFER EFFORTS SHALL BE ACKNOWLEDGED AS A PRIMARY ACTIVITY IN SUPPORT OF THE MISSION OF THE DP COMPLEX AND WILL BE EVALUATED.

COMMENTS:

- National security remains the primary mission of the DP weapons complex and the technology transfer activity will be conducted to support this mission.
- During the course of accomplishing the DP mission, numerous opportunities arise whereby the DP complex can share its technologies and capabilities with the private sector. These technology transfer interactions are important to the economic well-being and security of the U.S. and, as such, are encouraged.
- Technology transfer interactions with industry can also directly benefit the weapons program and further the primary mission. In selected instances of this type, technology transfer interactions may be required by the cognizant DP program office(s) in the performance of work under the contract.
- The Technology Transfer Program will be a resource to the private sector, not a competitor. DP technology transfer efforts will foster a climate conducive to private sector commercialization of technology.
- The Field Operations Offices will determine the level of effort for their respective facilities, consistent with their contracts, and will also be responsible for evaluating this effort.

PRINCIPLE NO. 3: INCENTIVES SHOULD BE PROVIDED TO PROMOTE TECHNOLOGY TRANSFER RELATED EFFORTS.

COMMENTS:

- The program encourages, to the extent permitted by the corporate policies of the Management and Operating contractor, the establishment of an employee recognition program including awards to reward its personnel for exemplary activities contributing to technology transfer efforts.
- Personnel policies of DP facility operators should provide that contributions to technology transfer efforts as well as research publications be recognized for individual career advancement.
- Contractor organizations should be rewarded for their technology transfer efforts.

PRINCIPLE NO. 4: THE SECRETARY OF ENERGY HAS MANAGEMENT AUTHORITY AND RESPONSIBILITY FOR THE TECHNOLOGY TRANSFER PROGRAM.

COMMENTS:

- The Secretary of Energy is responsible to the President and the Congress for assuring that the operations of the Department of Energy are conducted in accordance with existing laws and policies.
- Therefore, all activities of DOE employees and DOE contractor organizations must be conducted pursuant to currently delegated authority from the Secretary.
- Where necessary to expedite the Technology Transfer Initiative the Secretary shall establish new policies and expressly delegate authority to carry out said policies. This delegation will be consistent with current delegations for the DP mission.

PRINCIPLE NO. 5: THE DP TECHNOLOGY TRANSFER PROGRAM WILL BUILD UPON THE DECENTRALIZED DOE MANAGEMENT STRUCTURE AND CAPITALIZE ON THE UNIQUE RELATIONSHIP BETWEEN DP AND ITS MANAGEMENT AND OPERATING CONTRACTORS.

COMMENTS:

- Historically DOE has provided policy and oversight with the Management and Operating contractors doing the job.
- In utilizing the Management and Operating contractor concept, DOE has drawn upon industrial expertise in implementing its programs. This technology transfer initiative will expand upon that concept, converting it to a two way flow of information thereby improving the benefits to the DP complex and to the private sector.

PRINCIPLE NO. 6: DOE HEADQUARTERS MAINTAINS BROAD OVERSIGHT AND POLICY GUIDANCE; DOE FIELD OFFICES PROVIDE OVERSIGHT, PROGRAM COORDINATION AND APPROVALS AND THE FACILITY CONTRACTORS CONDUCT THE TECHNOLOGY TRANSFER PROGRAM.

COMMENTS:

- Headquarters has responsibility for programs. It is responsible for Executive Branch Policy and Congressional liaison and plays a proactive role with other agencies, interest groups, etc. It sets the framework for Field actions.

- Programs are implemented in the field through Field Operations and Area Offices. They are the best place to monitor the local situation and decide whether a proposed course of action conforms to declared Departmental Programmatic Policy.

- Projects are conducted by the facility contractors pursuant to the Program and in accordance with Departmental Policy and their contracts. First line decision making takes place here.

- The implementing guidelines should draw from and enhance current authorities and responsibilities for the nuclear weapons program.

PRINCIPLE NO. 7: ACTIVITIES WILL COMPLY WITH APPLICABLE LAWS AND REGULATIONS INCLUDING:

COMMENTS:

- Sherman Anti-Trust Act of 1890
- The Atomic Energy Act of 1954, as amended
- Freedom of Information Act of 1966, as amended
- Federal Nonnuclear Energy Research and Development Act of 1974
- National Science & Technology Policy, Organization & Priorities Act of 1976 (PL 94-282)
- Nuclear Nonproliferation Act of 1978
- Export Administration Act of 1979, as amended
- Stevenson-Wydler Technology Innovation Act of 1980 (PL 96-480)
- Bayh-Dole Patent and Trademark Amendments Act of 1980 (PL 96-517)
- The Trademark Clarification Act of 1984 (PL 98-620)
- National Cooperative Research Act of 1984 (PL 98-462)
- Federal Technology Transfer Act of 1986 (PL 99-502)
- Executive Orders, National Security Decision Directives, and Ratified Treaties are subsumed under Laws and their Implementing Regulations and will also be observed. These include but are not limited to: E.O. 12591 "Facilitating Access to Science and Technology; NSDD 189" National Technology Transfer Policy and, "The U.S.-Canada Free Trade Agreement of 1988."

PRINCIPLE NO. 8: PREFERENCE WILL BE GIVEN SO THAT THE PRINCIPAL BENEFITS RESULTING FROM THE TECHNOLOGY TRANSFER EFFORTS FLOW TO THE U.S.

COMMENTS:

- Procedures should be developed to determine the foreign interest characteristics of firms interested in commercializing technology from the DP complex.
- In transfer negotiations involving technologies posing minimal or no national security risk, efforts should be made to obtain assurances that products resulting from the commercialization activities will be substantially manufactured in the U.S. in accordance with the provisions of 35 USC 204.
- In transfer negotiations involving technologies posing national security risks, stricter criteria for selecting recipients will be developed.
- Procedures should be developed to further refine the U.S. preference provisions of 35 USC 204 and facilitate their implementation.
- In accordance with the provisions of such treaties as the U.S.-Canada Free Trade Agreement, U.S. preference considerations apply equally to those countries so entitled.

PRINCIPLE NO. 9: THE DP TECHNOLOGY TRANSFER PROGRAM MUST BE CONDUCTED IN A MANNER THAT PROVIDES "FAIRNESS OF OPPORTUNITY".

COMMENTS:

- The program will be conducted in accordance with the highest ethical standards.
- The DP Technology Transfer Program will use its best efforts to ensure that opportunities are made available in a manner that does not improperly favor one firm over another.
- An outreach program must be established to broadly inform potential parties of opportunities.
- The outreach program will be nationwide and emphasize complex-wide capabilities and means for industry to access those capabilities; industry will be advised that while equal opportunity exists, individual firms are responsible for taking advantage of such opportunities.
- Facilities must be user friendly to encourage utilization and facilitate equal access.
- DP operating procedures for technology transfer efforts based on accepted business practices must be established and be publicly available.
- Proposed business arrangements from industry will be fairly evaluated in terms of which best serves Government program objectives.
- Consistent and defensible criteria for making technology transfer decisions must be established and such decisions should be adequately documented.

PRINCIPLE NO. 10: INDUSTRY PARTICIPANTS WILL BEAR THE COSTS OF TECHNOLOGY TRANSFER ACTIVITIES COMMENSURATE WITH THE BENEFITS DERIVED.

COMMENTS:

- Technology transfer activities will be limited to those areas where a unique capability exists so as to preclude competition with private industry.
- Costs will be recovered from industrial participants in proportion to the commercial benefit derived by the participant. However, compensation may be in the form of derivative program benefits.
- Seed money may be provided to initiate promising new technology transfer activities.

PRINCIPLE NO. 11: REVENUES DERIVED FROM TECHNOLOGY TRANSFER ACTIVITIES WILL BE FED BACK INTO THE PROGRAM TO ENHANCE THE TECHNOLOGY TRANSFER EFFORT.

COMMENTS:

- Mechanisms, such as a special account, may be established at facilities in the DP complex for revenues derived from technology transfer activities.
- Technology transfer activities for which funds from this account could be used must be specifically identified.
- Seed money may be required initially for some projects.
- Priority for seed money should go to projects with a high multiplier effect, not only in terms of potential dollar return per dollar invested but also those which provide the highest probability of success and program benefit for the effort invested.
- Wherever a suitable ceiling on the level of commercialization effort as a percentage of total facility effort is not already in existence, one will be established by the cognizant DOE Field Office to ensure that commercialization efforts will not interfere with the prime mission of the facility.

PRINCIPLE NO. 12: SPEED AND CERTAINTY IN THE DECISION PROCESS ARE CRITICAL TO SUCCESS AND MUST BE ASSURED.

COMMENTS:

- Authority to make decisions regarding technology transfer activities should be delegated to the lowest appropriate level consistent with good administration and management practices.
- Procedures for review and approval should provide for appropriate and enforceable time limits.
- Delegated authority will be exercised in accordance with established criteria and procedures.
- Model business arrangements should be developed to the extent that they expedite the technology transfer process.
    - Generic agreements should be developed for selected categories of standard commercialization activities to ensure timely approval by DOE.
    - For non-standard activities, efforts should be made to develop various options of standardized language to cover difficult or unusual circumstances.
    - For agreements involving unprecedented provisions, field organizations and, as necessary, Headquarters will endeavor to conduct their reviews in an expeditious manner.
    - In any case, flexibility should be provided to allow field organizations the ability to conduct technology transfer activities in a sound, business-like manner consistent with statutes and regulations.

PRINCIPLE NO. 13: **THE DP TECHNOLOGY TRANSFER PROGRAM WILL DELEGATE AUTHORITY TO THE LOWEST APPROPRIATE LEVEL.**

COMMENTS:

- Critical for speed
    - -- Can be implemented through a modular approach that utilizes pre-established procedures and model contracts.
- Certainty
    - -- Enables industry to quickly determine whether or not they can enter into a business arrangement.
- Will be done with appropriate checks and balances, oversight and accountability.

PRINCIPLE NO. 14: RESEARCH RESULTS WILL CONTINUE TO BE BROADLY DISSEMINATED TO FURTHER THE ADVANCEMENT OF SCIENCE AND ENCOURAGE INNOVATION

COMMENTS:

- Basic research results will continue to be broadly disseminated.
- Applied technical data of no apparent commercial value will also be broadly disseminated.
- Appropriate, preferably short term, time limits should be established for the eventual release of commercially valuable information to advance basic science and encourage innovation.
- Research results associated with commercially valuable information should be released whenever it can be done without significantly diminishing the commercial value of the information.

PRINCIPLE NO. 15: **BOTH CLASSIFIED AND UNCLASSIFIED SENSITIVE INFORMATION MUST CONTINUE TO BE FULLY PROTECTED.**

COMMENTS:

- Procedures must be developed to assure that technology transfer efforts do not result in disclosure of classified or sensitive (but unclassified) information to unauthorized persons.

- While both classified and sensitive unclassified information can be considered for technology transfer efforts, transfer can only occur under appropriate security arrangements.

- In some cases, information is classified or sensitive only because of its association with a classified or sensitive program or technology. Disassociating the two can render the information unclassified and/or nonsensitive. It is also possible that commercial products produced from classified or sensitive information could still be unclassified and nonsensitive.

- Commercial products based on sensitive information could be subject to export restrictions.

- In other cases, sensitive information could be useful in producing new or improved classified products for military use.

- Appropriate security arrangements will need to be developed for these and other situations that might arise.

PRINCIPLE NO. 16: PROCEDURES MUST BE DEVELOPED THAT INCLUDE A DP OVERSIGHT ROLE TO IDENTIFY AND WITHHOLD COMMERCIALLY VALUABLE GOVERNMENT INFORMATION FROM PUBLIC DISSEMINATION WHILE, AT THE SAME TIME, ASSURING THE CONTINUED FREE FLOW AND USE OF THIS INFORMATION WITHIN THE DP COMPLEX AND RELEASE OF APPROPRIATE RESEARCH RESULTS TO THE PUBLIC.

COMMENTS:

- Procedures should be developed to provide for early identification and marking of commercially valuable government information* to protect it while ensuring continued information sharing within the facility and among the DP complex.

- Each facility should establish procedures to withhold commercially valuable government information from public dissemination where these are not already in existence.

- Criteria should be developed for identifying what information can be considered commercially valuable, under what conditions and for how long such information can be withheld from public dissemination, and what information must be publicly released.

- "Release of appropriate research results to the public" includes, but is not necessarily limited to the free and open dissemination of basic research results.

*includes both wholly Government funded and cost-shared information, but excludes basic research.

PRINCIPLE NO. 17: PROCEDURES MUST BE DEVELOPED TO PROTECT PROPRIETARY INDUSTRIAL INFORMATION.

COMMENTS:

- Each facility should establish procedures to assure the protection of proprietary industrial information where these are not already in existence.
- Information designated as proprietary and provided to the DP complex by industry must be explicitly identified as such to ensure proper treatment and protection.
- Contractors are legally bound by the terms of any nondisclosure agreement they sign. Government employees, however, are subject to the provisions of 18 USC 1905 which provides for criminal sanctions for wrongfully disclosing proprietary industrial information.
- Where not already included, management and operating contracts shall be amended to contain provisions requiring the protection of proprietary industrial information.

Question: Is there a policy coordinating committee for this kind of technology transfer? How was it established, and by whom?

Answer: Yes. The Office of Policy, Planning and Analysis was assigned overall responsibility for coordination and development of DOE-wide technology transfer policies by the Deputy Secretary in December 1989. The primary coordinating committee is the Technology Transfer Project Group (TTGP), authorized by the Deputy Secretary in January. The TTPG includes senior managers and staff from all program and support offices. In addition, there is a Technology Transfer Field Task Force, led by the Albuquerque Operations Office, that includes participants from all operations offices and laboratories in DOE. There is also a staff level committee, the Technology Transfer Advisory Committee, that focuses primarily on the technology transfer component of the National Energy Strategy. Finally, the Secretary of Energy authorized the formation of an Executive Committee at the Assistant Secretary/Director level, which is chaired by the Deputy Secretary. The Executive Committee provides a senior-level mechanism for the review and recommendation to the Secretary of policy positions that cut across all Departmental elements, including technology transfer issues. While many of the staff and field level committees were formed as temporary task teams (under 18 months), we expect to develop a permanent coordinating structure to facilitate intra-departmental communications. Specific recommendations are being developed by the Technology Transfer Project Group at this time.

Within Defense Programs a Steering Group comprised of all elements of the weapons complex has been established to develop a consensus direction for the DP Technology Commercialization Initiative. The Steering Group has been instrumental in the formulation and development of policies for this Initiative, including the DP Charter mentioned above. In addition, DP is initiating a staff level working group of DP Headquarters personnel to explain the Initiative to all elements of the DP organization and involve them in its conduct.

Question: We all recognize that the national security mission of the national labs will be slowly phased down with the changing world order. As the labs in my state will attest, I have been encouraging them in the technology transfer direction for quite some time. What is DOE's view of the importance of its technology commercialization role? What has DOE done to advance this role fiscally and organizationally?

Answer: Defense Programs believes that an aggressive program of technology transfer is vital to meet the goals and objectives of the weapons complex. Experience has shown us that a strong industrial base is absolutely essential if we are to have reliable domestic suppliers for our high technology needs, which will be essential as DP moves forward to modernize and streamline the weapons complex. Further, we are convinced that the extraordinary scientific and technological capabilities of all of our laboratories, including defense, energy, and basic science, can contribute to U.S. industrial competitiveness overall. While it is industry's responsibility to commercialize technology, we believe that there is a role we can play to facilitate industry's access to the DOE's research capabilities.

Defense Programs' efforts have been modest so far since the Technology Commercialization Initiative is a new program within DP and has required extensive planning to ensure that it complements the existing national security mission. Consequently, OCTP has requested a review of the fiscal and organizational support for this new Initiative in the context of current reorganization plans within DP. We will attempt to assure that the DP technology transfer function is given the level of prominence within the DP organization necessary for it to function effectively. Recently, OCTP was reorganized so that the Chief of the Technology Management Branch, which is the organization responsible for DP technology transfer activities, reports directly to the Director, OCTP. Fiscally, technology transfer activities will be funded in FY 1991 at the $10.4 million level.

On a Department-wide basis, several initiatives are underway to develop the organizational and fiscal mechanisms to implement the technology transfer mission. Through the Technology Transfer Project Group and the Field Task Force, organizational alternatives to assist the efforts of all Departmental elements are being examined. The goal is to decentralize decision making to the greatest extent possible. To do that, clear policy guidance and procedures need to be developed at all levels to assist these decision makers. Through the Department-wide Planning and Budgeting Initiative, efforts are underway to link the National Energy Strategy to the program planning and budgeting activites. Technology transfer is a key component of that effort. Although specific funding decisions are made by each program, our Office of Policy, Planning and Analyis will be working with the Secretary to ensure that all programs and laboratories have adequate funding to support their technology transfer activities.

Question: What visibility is this initiative being given within the Department? How many full-time staffers are now working on this program?

Answer: At the present time, the Defense Programs Technology Commercialization Initiative is supported within the Office of Classification and Technology Policy with three full time DOE professional staff members plus two technical specialists on detail from two of the national laboratories. OCTP is currently recruiting to fill two vacant positions and to bring additional national laboratory detailees on board. OCTP has requested significant additional personnel resources to provide for the effective management of this vital and rapidly expanding program.

Technology transfer activities have the full support of the Secretary, the Deputy Secretary, and the senior managers of the Department. Currently, there are over 100 participants from DOE Headquarters and field who are working full or part-time in the development of implementing procedures for the National

Competitiveness Technology Transfer Act of 1989. Many of these individuals have day-to-day responsibility for technology transfer activities; however, they represent only a small portion of the number of people who have some involvement with technology transfer activities throughout the DOE complex. Notwithstanding this widespread involvement in technology transfer, on a program-by-program, or laboratory-by-laboratory basis, full-time staffing is limited. As we move further with our development of the National Energy Strategy, the implementation of the National Competitiveness Technology Transfer Act of 1989, and the development of the DOE Planning and Budgeting Initiative, we will be evaluating the effectiveness of these staffing levels and may recommend increases in a number of areas to support the increased emphasis on technology transfer.

Question: How does DOE propose to spend the $10 million requested by the President for technology transfer initiatives in FY 1991?

Answer: The $10 million budgeted by Defense Programs (DP) in FY 1991 for the Technology Commercialization Initiative will be spent to support: (a) the three current projects (Advanced Manufacturing Initiative, Specialty Metals Processing, and Radioluminescent Lighting); (b) six new technology transfer projects; and (c) program planning activities to facilitate the day-to-day management of the Technology Commercialization Initiative and program development activities directed toward developing the operating organizational structure necessary for the timely and effective implementation of the technology transfer activities.

One of the important criteria that will be used in the selection of new technology transfer projects is the market driven nature of the government-industry collaboration. In addition, the selection criteria will require that there be a programmatic benefit to the weapons complex from technology transfer projects undertaken in collaboration with the private sector.

Because technology transfer is a new activity for DP, there is currently a limited resource base to manage and conduct technology commercialization activities. In order to conduct effective technology transfer, this resource base must be enhanced.

Question: An article in the March 12th Washington Post highlighted two industry consortia that DOE will support under the new Act. These consortia will collaborate with the national labs in the critical fields of specialty metals and precision machining. The consortia are the Advanced Manufacturing Initiative Consortia and the Specialty Metals Processing Consortia, in which Sandia National Lab will participate.

I understand that DOE envisions a $4 million Federal level of effort over a five-year period to support these partnerships. The total estimated cost of these projects is approximately $9.25 million.

With the $1 million appropriated in FY 1990, can DOE support any additional collaborations this fiscal year?

Answer: No. DP funding for FY 1990 has been exhausted in support of our current pilot projects. Thus, the current level of FY 1990 funding for DP technology transfer activities will not allow DP to take further advantage of other opportunities for collaboration with industry.

Question: How many more consortia could be put in place if additional funding were available? Under Secretary Tuck has testified that "over 40 high-quality proposals" have already been received. Mr. Barker indicates in his statement that six more technology transfer projects are envisioned for FY 1991.

Answer: If additional funds were available in 1990, it is expected that four additional technology transfer projects could be initiated under the Defense Programs Technology Commercialization Initiative. These projects are in the following technological areas: industrial applications of copper lasers; quality improvements in the production of titanium; modelling of releases of radioactive and toxic materials to the atmosphere; and waste acid cleanup for recycling. Based on discussions with the laboratories and informal expressions of industry interest, about 15 technology transfer projects (beyond the six already projected) could be ready for support in FY 1991.

Question: How much in additional funding would DOE need to support these projects in FY 1991? Could additional funding be used beyond this amount based on the response DOE is receiving from industry? What is the largest amount of funding industry has been willing to commit thus far to a consortia effort under this Act?

Answer: Defense Programs (DP) could initiate many new projects in FY 1991 that would require additional funding. Not all of these would be with industrial consortia; many of them could be with individual companies. Final determinations would be based on specific expressions of industry interest and what is in the best interest of the government.

In addition, DP currently has suggestions for another 30 technology transfer projects from the DP field complex. These are in various stages of formulation and evaluation. Most of them involve specific technology applications as contrasted with the broad technology area approach of the Specialty Metals and Advanced Manufacturing Initiatives. A number of these could evolve into broad technology efforts with industrial consortia, while others will be specific applications with a selected industrial partner or partners.

Under the Specialty Metals Program, the industry partners will contribute more than $3 million over the initial 5-year period. In the Advanced Manufacturing Initiative, both the National Center for Manufacturing Sciences and individual member companies have expressed interest in participating in, and supporting, selected activities relating to that initiative. While specific amounts remain to be negotiated, it is expected that industry contributions will be in the multimillion dollar range.

Question: While the budget request is a step forward in implementing the Act, it appears to me that industry interest is significant enough to warrant additional funding. Based on contacts DOE has had to date, how much additional funding could be utilized for consortia under the National Competitiveness Technology Act in FY 1991?

Answer: Internal Defense Programs budget reviews indicate that the DP Technology Commercialization Initiative could effectively utilize some additional funding for FY 1991. This conclusion is based on contacts DP has had with a wide range of representatives from the U.S. private sector, including industry and universities. The greatest share of this funding would be used to support collaborative projects including arrangements with consortia in market driven areas, as defined by private sector interest in cost-shared arrangements. A portion of this funding would also be used to assure the necessary resource base is in place to effectively implement an expanded DP technology transfer program.

Question: Would you please provide a breakdown of these costs for the Subcommittee?

Answer: Additional funding in FY 1991 could be used to fund technology advancement projects including collaboration with industry consortia. Additionally, funding would go to program planning to facilitate the day-to-day management of the Technology Commercialization Initiative, and to program development activities directed toward developing the operating organizational structure which is essential to the effective expenditure of additional funding. A specific breakdown of how this program development funding would be allocated cannot be determined at this time since the financial arrangement for each project must be individually negotiated with industrial partners on a case-by-case basis.

Question: Can you describe how DOE goes about determining the needs of industry in this program? In other words, what outreach activities will DOE take to let industry know what technology it has, and how does DOE determine how it can best make its technology available to industry for its use?

Answer: The Defense Programs Technology Commercialization Initiative focuses on technology areas that are critical both to DP programmatic needs and to U.S. competitiveness. In addition, a key principle of the DP technology transfer program is that DOE/industry collaboration must build upon the forces of the free market, and be market driven. The DP program recognizes that industry is in the best position to commercialize technology. This approach has been applied in the formulation of the Advanced Manufacturing Initiative and the Specialty Metals Processing projects which will add to the experience base leading to the formation of additional projects in other technology areas. These projects, combined with the continuing review of experience from other DOE and Federal agency technology transfer efforts, will help provide the foundation for a national outreach program to assure industry awareness of the technologies and capabilities of the DP laboratories. We believe that an outreach program is essential to help address fairness of opportunity principles and to assure that information relating to technologies is available to those U.S. companies who are best positioned to effectively undertake product development and commercialization. An outreach program will also assure that DP's fairness of opportunity principle is effectively implemented to allow all U.S. companies an equal chance to compete for technologies developed at the taxpayer's expense.

Plans for the Defense Programs outreach effort include using existing Federal Government publications such as the Federal Register and Commerce Business Daily; conducting continuing liaison conferences and workshops directly with industry to determine their needs and how the DP complex can best make its technologies and capabilities available to industry; and possibly using a new publication entitled Defense Programs Technical Briefs. There is also consideration being given to the establishment of a toll free 1-800 Technology Transfer Hotline and dial up access to a technology database. Defense Programs will also participate in other planned outreach efforts which will involve all Departmental elements and laboratories.

From a DOE-wide perspective, the entire issue of technology transfer outreach, including the best methods to obtain industry input and make industry aware of DOE's resources, is being considered as a part of the Department's overall efforts in response to the National Competitiveness Technology Transfer Act of 1989. In this regard, a special "Outreach and Industry Liaison" team is being established to examine all of the issues associated with technology transfer outreach and to develop recommendations that will support the efforts of all Departmental elements and laboratories.

Question: Finally, this is one Senator who does not intend to lose sight of these funds, and how they are used by the Department for technology transfer purposes. I would formally request that you keep me and my staff informed of how this program is going. Would you also tell the Subcommittee how DOE intends to assess the success of the program?

Answer: We will be pleased to keep Senator Domenici and staff apprised of DP's progress as we move forward to implement an aggressive program of technology transfer that benefits both DP and the competitive position of U.S. industry.

In implementing the new DP Technology Commercialization Initiative, we intend to assess our performance on a continuing basis. The factors of success we will consider include, but are not limited to, the following:

- the benefit to DP goals and program objectives;
- increased domestic commercialization of DOE technology by U.S. industry;
- the extent of U.S. industry financial commitment to existing and planned technology transfer activities;
- increased industry interest in DOE technology transfer opportunities;
- increases in licensing and royalty revenues;
- increased U.S. industry/DOE personnel exchanges; and
- increased U.S. patent filings resulting from DOE/U.S. industry collaboration.

We will be reviewing our measures of success to gauge our performance as we gain greater experience in working with U.S. industry.

Technology Development

Question: Within the Environmental Restoration and Waste Management account, you are requesting $206 million for technology development. How do you propose to spend these funds?

Answer: The Office of Technology Development's strategy is to encourage innovative and creative technology that reduces risks, costs, remediation time, and the generation of new waste. This strategy is clearly applicable to meeting the Department's 30 year goal for cleanup and waste management as described in the Five-Year Plan. To do this, proposals for innovative technology must come from industry, universities, DOE laboratories and laboratories from other Federal agencies. Standard Federal procedures have been used to solicit proposals from industry, with particular attention to methods to expedite the procurement process. R&D proposals are submitted based on criteria which allow the prioritization of the technology related to problems and technology needs. External and internal technical evaluations of the proposed technologies provide the basis for collective review by DOE Technical Program Officers from each field office.

The fiscal year 1990 budget for technology development is $183.5 million. The proposed activities are sorted and ranked by categories to arrive at the overall budget which is summarized for FY 1990 in the table below:

Technology Development
FY 1990 Planned Expenditures (thru April)
(Dollars in Millions)

Category	Millions
Characterization	$ 8.5
Risk Management	2.1
Remedial Action	32.9
In Situ Remediation	11.0
Decontamination and Decommissioning Technology	1.0
Waste Treatment	17.7
Waste Minimization	10.6
Robotics	4.2
Info Systems & Data Bases	.0
Analytical Support	1.3
Technology Assessment, Evaluation and Implementation	8.2
Innovative Technology	1.8
Education and Research	12.7
Program Support	9.5
Storage and Disposal	.0
Containment Technology	2.6
All Other	24.3
TOTAL	$148.4

Question: What are your objectives for the expenditure of these funds?

Answer: Our principal objective is to manage and direct programs and activities to establish and maintain an aggressive national program for applied research and development to resolve major technical issues and to advance rapidly beyond current technologies for environmental restoration and waste management operations. DOE shares many chemical remediation problems with industry and other Federal agencies. It is unique in also having to remediate radioactive materials. We will attempt to use existing technologies developed by industry and DOD for purely chemical remediations. We will focus our R&D funds to develop technologies which apply to radioactive and mixed waste. Other objectives include the development of applied research, development, demonstration, testing, and evaluation (RDDT&E) initiatives to lower the cost of cleanup, reduce risks, and to ensure the Department's 30-year cleanup goal will be met.

We envision a "development cycle" in which innovative research would be carried out primarily at the national laboratories and universities. These efforts would be supported by industry in the development of technology, for example, for ground water remediation and in situ stabilization of wastes. When a technology enters the demonstration phase, the laboratories would be teamed with industrial partners to provide cleanup demonstrations at DOE and private sector sites. In the final phase of the cycle, technology would be transferred to industry for wide-scale application at sites requiring remediation. Where applicable, demonstrations would also be proposed as multiagency efforts to foster more rapid deployment.

Many observers have noted the shortage of professionals in the environmental restoration and waste management areas. The shortage is even more acute in the RDDT&E disciplines that support cleanup activities. For this reason, we will vigorously support education programs to meet present and future personnel needs. We are taking the long view--we want to assure that a knowledgeable talent-pool will exist to complete DOE's cleanup program in 30 years.

Question: Do you believe technology development will reduce considerably the cleanup costs and proper environmental management of DOE defense facilities?

Answer: The RDDT&E program supports DOE's 30-year compliance and cleanup goal by establishing a means to develop better, faster, and more cost-effective solutions to environmental restoration and waste management problems. The use of new and innovative technologies are a "must" if we are to significantly lower the cost of cleanup.

At the heart of our program is time-phased, needs driven selection of potential cleanup technologies. Because of pressures of time and cost, we will not pursue all alternatives to cleanup. Rather, DOE needs that are pervasive such as groundwater remediation, extraction of organics and inorganics from soils, waste minimization, and in-situ waste stabilization will drive the selection of technologies that have wide application.

The development of cost/benefit models in our selection of RDDT&E projects will be specifically intended to select the most promising of technologies for decreasing cleanup costs and improving environmental management of DOE defense facilities. With the experience from "lessons learned" at our facilities, and the careful selection of new technologies, we believe that we can significantly reduce cleanup costs. An area that has high potential for cost savings is characterization. For example, by addressing a rational approach to statistically-based placement of wells, in situ and remote monitoring and application of automated analysis, we believe large savings can be realized.

Question: To what extent will you devote this funding to the nation's laboratories, particularly the Sandia and Los Alamos laboratories?

Answer: The principal objective of EM's Technology Development Program is to provide new technological solutions to problems within the Environmental Restoration Program and Waste Management Operations. These solutions must meet currently negotiated schedules and be acceptable to all regulatory agencies.

The Office of Technology Development (TD) intends to use all available resources to identify or create responsive solutions. TD will rely heavily on the existing National Laboratory system to develop new and improved technologies because of the system's extensive technical capabilities, close ties with DOE operating sites, and role in DOE's basic research programs. TD also intends to increasingly emphasize work with U.S. industries, other Federal agencies, international organizations, and universities to transfer in existing technology solutions or to support the National Laboratories.

TD, in close cooperation with the Environmental Restoration and Waste Management programs, is using a systematic process to identify needs for technologies and the most beneficial and acceptable solutions. TD is accepting proposals from all interested organizations, and is allocating its funds to the best and most responsive proposals and not to specific organizations.

The majority of the funding for technology development activities is expected to go to the National laboratories, with the remainder going to industrial participants and universities. The non-technology portion of TD's budget will be allocated to educational initiatives, enhancement of DOE analytical laboratory capabilities, and several EM coordination activities. The FY 1991 budget has not been allocated, so it is currently not possible to provide figures on the distribution of funds. This distribution will be somewhat different from that for FY 1990 due to the probable redirection of several current programs and the increase in base funding.

The Sandia and Los Alamos laboratories are playing important roles in the current program. Sandia has a central responsibility for coordinating the robotic science and technology initiative, and both organizations have a number of projects focused on treatment processes, such as super critical water oxidation and plasma destruction, characterization technologies (such as laser spark analysis), and waste minimization techniques (such as solvent substitution).

SUBCOMMITTEE RECESS

Senator DOMENICI. The subcommittee will stand in recess until tomorrow at 10 a.m.

[Whereupon at 4:45 p.m., Thursday, April 19, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1990

FRIDAY, APRIL 20, 1990

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:15 a.m., in room SD-138, Dirksen Senate Office Building, Hon. Jim Sasser presiding.

Present: Senator Sasser.

TENNESSEE VALLEY AUTHORITY

STATEMENT OF MARVIN RUNYON, CHAIRMAN, TENNESSEE VALLEY AUTHORITY BOARD

ACCOMPANIED BY:

JOHN B. WATERS, DIRECTOR

C.H. DEAN, DIRECTOR

STATEMENT OF SENATOR JIM SASSER OF TENNESSEE

Senator SASSER. The subcommittee will please come to order.

This morning we continue our hearings on the President's fiscal year 1991 budget request. Today we will hear from the Tennessee Valley Authority.

We are pleased to have with us this morning the Chairman of the Board of TVA, Mr. Marvin Runyon, who is joined by Directors Charles H. Dean and John Waters. As we all know, this is Mr. Dean's last appearance before this subcommittee as a member of the TVA Board.

Mr. Dean will soon be retiring from the Board after a distinguished term of service at TVA. Mr. Dean brought a unique perspective to the Board. He was the first Director who had been a TVA power distributor. He was also president of the Tennessee Valley Public Power Association. That experience served him well. He has distinguished himself during a time of great change at TVA. I am sure I speak for all the members of this committee in wishing him well in his future endeavors.

This truly has been a time of change at TVA. Two years ago, Mr. Runyon came before this committee as a new Chairman. At that time, he had just announced an ambitious plan to streamline operations at TVA with the goal of keeping rates level for at least 3 years. Two years later, rates have not gone up, and it looks as if they will remain stable for at least the third year and perhaps beyond.

Mr. Chairman, I want to commend you and your fellow members of the Board for achieving what I think is a very, very important goal and express my appreciation to you on behalf of our entire congressional delegation, and I would imagine on behalf of the ratepayers of the Tennessee Valley area.

NUCLEAR POWER PROGRAM

I also want to commend TVA for the improvements it has made in its nuclear program. The nuclear program has been a matter of long concern to all of us. There was a time when it looked as if we would never get this nuclear program up and going again, and the Tennessee Valley nuclear program was an object of ridicule and scorn by others all across the country and particularly here in the Congress.

Well, that nuclear program has been turned around. The Sequoyah plant has been rated as one of the best in all of the United States, and another reactor at Browns Ferry will soon be returned to service.

The nuclear power program and entire power production program, of course, is crucial to the economy of the Tennessee Valley region, and I want to express my appreciation to you, Mr. Chairman, and to your fellow members of the board for what I think has been a truly outstanding job in getting your nuclear power program turned around and getting it operating and working, we are told, in a safe and in a cost-efficient manner.

Now, let me move to another area in which TVA can, and should, be a leader in the Tennessee Valley region, and that is the environment.

ENVIRONMENTAL PROTECTION AND CONSERVATION

This weekend we are going to mark the 20th anniversary of Earth Day. On Earth Day's 30th anniversary, I hope we will also celebrate a decade of accomplishment by TVA in environmental protection and conservation.

The Tennessee Valley Authority has traditionally been a national leader in developing innovative approaches to protecting the environment. Indeed, that was one of the reasons the Tennessee Valley Authority was created back in the 1930's. It was one of the first coal users to require environmentally sensitive surface mining techniques in its coal contracts and TVA's innovation in that area has been copied all across the country.

TVA was one of the first utilities to embrace acid rain legislation. The Tennessee Valley Authority has been a leader in developing sulfur dioxide removal technology for coal-fired plants and the Tennessee Valley Authority has initiated some extraordinary advances in land management practices around the TVA reservoirs. In fact, TVA was, at one time, at the very forefront and on the cutting edge in this country of promoting energy conservation and other environmentally benign energy technologies.

Now, I commend the commitment made by the Board to make environmental leadership one of TVA's primary missions in the 1990's. I am certain that it reflects a genuine desire to renew a leadership role that appears to have become perhaps secondary in the last few years, and perhaps that is understandable, considering the other problems that TVA has faced. But I have to say that I am very concerned that TVA has lost the initiative with respect to environmental consciousness.

Not long ago, the Tennessee Valley was poised to become a national laboratory for environmentally sensitive energy use and land and water development. Some have said that we are still not in the same advanced guard, and I would agree with them, but I think we should be and perhaps now more than ever.

I have just returned—I was telling Director Waters—from a trip to the Soviet Union. I spent almost a whole morning there discussing various and sundry things with Mr. Gorbachev, met with a number of leading Soviet governmental officials, scientists, military leaders, elected officials, and one thing that kept coming up—also on a stop in Germany—is that nation after nation is looking to develop technologies that use natural resources without abusing these resources or depleting them.

Just this past month we, in the Senate passed a clean air bill that will mean that the 1990's will be the second decade, I believe, of the environment here in this country.

Well, the Tennessee Valley Authority has the tradition and the mandate to push the Tennessee Valley to the forward frontier of the new era of environmental sensitivity. I know that the Fertilizer Institute has been reorganized to focus some research on environmental issues. But, again, I am fearful that TVA has not clearly articulated its environmental agenda for the 1990's.

Now, I believe that Earth Day week gives us a good opportunity in the Tennessee Valley region to refocus and reenergize TVA's environmental mission, and I would like to challenge our Board here today to use the Muscle Shoals Center to develop by the end of this year a comprehensive 10-year plan for TVA's environmental problems.

The plan should include a whole range of environmental issues including water quality, air quality, and waste management, including the promising new refuse-derived fuel technology.

I believe the development of such a plan could help TVA achieve its goal to provide national leadership in this decade of the environment and I think we in the Congress should try to help you achieve that goal and the other objectives that you have laid out for the decade of the 1990's.

Now, once again, our job is made harder by the budget request we are considering today. For example, the Fertilizer and Environmental Center is one of several very important programs that are threatened by President Bush's proposed cuts in the TVA budget. And though President Bush has been a little bit kinder and gentler to TVA than his predecessor, he nevertheless, has proposed a major cut from last year's appropriated amount.

I said over the years that the Tennessee Valley Authority has already taken its fair share of the cuts and more, and we intend—I intend—to work hard to see that we maintain level funding for TVA this year.

Now, having said that, I would like to turn to Chairman Runyon and his fellow Directors and get their perspective here this morning on the President's budget plan and also get their views on the

Tennessee Valley Authority's very important mission in the decade of the 1990's that is before us as we approach the year 2000.

STATEMENT OF SENATOR SASSER

Chairman Runyon, we will now turn to you for your statement and observations you would wish to make.

[The statement follows:]

STATEMENT OF SENATOR SASSER

THE SUBCOMMITTEE WILL PLEASE COME TO ORDER. THIS MORNING WE CONTINUE OUR HEARINGS ON THE PRESIDENT'S FISCAL YEAR 1991 BUDGET REQUEST. TODAY WE WILL HEAR FROM THE TENNESSEE VALLEY AUTHORITY.

WE ARE PLEASED TO HAVE WITH US THIS MORNING THE CHAIRMAN OF THE BOARD OF TVA, MR. MARVIN RUNYON, WHO IS JOINED BY DIRECTORS CHARLES H. DEAN AND JOHN WATERS. AS WE ALL KNOW, THIS IS MR. DEAN'S LAST APPEARANCE BEFORE THIS SUBCOMMITTEE AS A MEMBER OF THE TVA BOARD.

MR. DEAN WILL SOON BE RETIRING FROM THE BOARD AFTER A DISTINGUISHED TERM OF SERVICE AT TVA. MR. DEAN BROUGHT A UNIQUE PERSPECTIVE TO THE BOARD -- HE WAS THE FIRST DIRECTOR WHO HAD BEEN A TVA POWER DISTRIBUTOR. HE WAS ALSO PRESIDENT OF THE TENNESSEE VALLEY PUBLIC POWER ASSOCIATION. THAT EXPERIENCE SERVED HIM WELL. HE HAS DISTINGUISHED HIMSELF DURING A TIME OF GREAT CHANGE AT TVA. I AM SURE I SPEAK FOR ALL THE MEMBERS OF THIS COMMITTEE IN WISHING HIM WELL IN HIS FUTURE ENDEAVORS.

THIS TRULY HAS BEEN A TIME OF CHANGE AT TVA. TWO YEARS AGO MR. RUNYON CAME BEFORE THIS COMMITTEE AS A NEW CHAIRMAN. AT THAT TIME, HE HAD JUST ANNOUNCED AN AMBITIOUS PLAN TO STREAMLINE OPERATIONS AT TVA WITH THE GOAL OF KEEPING RATES LEVEL FOR AT LEAST THREE YEARS. TWO YEARS LATER, RATES HAVE NOT GONE UP, AND IT LOOKS AS IF THEY'LL-REMAIN STABLE FOR AT LEAST THE THIRD YEAR AND PERHAPS BEYOND. I COMMEND CHAIRMAN RUNYON AND THE BOARD FOR ACHIEVING THIS IMPORTANT GOAL.

I ALSO WANT TO COMMEND TVA FOR THE IMPROVEMENTS IT HAS MADE IN ITS NUCLEAR PROGRAM. THE SEQUOYAH PLANT HAS BEEN RATED ONE OF THE BEST IN THE NATION, AND ANOTHER REACTOR AT BROWN'S FERRY WILL SOON BE RETURNED TO SERVICE.

THE NUCLEAR POWER PROGRAM -- AND THE ENTIRE POWER PRODUCTION PROGRAM -- IS CRUCIAL TO THE VALLEY'S ECONOMY. I'D LIKE TO FOCUS TODAY, HOWEVER, ON ANOTHER AREA IN WHICH TVA CAN AND SHOULD BE A LEADER IN THE VALLEY REGION -- THE ENVIRONMENT.

THIS WEEKEND WE MARK THE TWENTIETH ANNIVERSARY OF EARTH DAY. ON EARTH DAY'S THIRTIETH ANNIVERSARY, I HOPE WE WILL ALSO CELEBRATE A DECADE OF ACCOMPLISHMENT BY TVA IN ENVIRONMENTAL PROTECTION AND CONSERVATION.

TVA HAS BEEN A NATIONAL LEADER IN DEVELOPING INNOVATIVE APPROACHES TO PROTECTING THE ENVIRONMENT. IT WAS ONE OF THE FIRST COAL USERS TO REQUIRE ENVIRONMENTALLY SENSITIVE SURFACE MINING TECHNIQUES IN ITS COAL CONTRACTS. IT WAS ONE OF THE FIRST UTILITIES TO EMBRACE ACID RAIN LEGISLATION. IT WAS A LEADER IN DEVELOPING SULFUR DIOXIDE REMOVAL TECHNOLOGY FOR COAL-FIRED PLANTS, AND IT INITIATED SOME EXTRAORDINARY ADVANCES IN LAND MANAGEMENT PRACTICES AROUND TVA'S RESERVOIRS. IN FACT, TVA WAS, AT ONE TIME, AT THE VERY FOREFRONT OF PROMOTING ENERGY CONSERVATION AND OTHER ENVIRONMENTALLY BENIGN ENERGY TECHNOLOGIES.

NOW I COMMEND THE COMMITMENT MADE BY THE BOARD TO MAKE ENVIRONMENTAL LEADERSHIP ONE OF TVA'S PRIMARY MISSIONS IN THE 1990'S. I'M CERTAIN IT REFLECTS A GENUINE DESIRE TO RENEW A

LEADERSHIP ROLE THAT APPEARS TO HAVE BECOME SECONDARY IN THE LAST FEW YEARS.

BUT I HAVE TO SAY I'M VERY CONCERNED THAT TVA HAS LOST THE INITIATIVE WITH RESPECT TO ENVIRONMENTAL CONSCIOUSNESS.

NOT LONG AGO, THE TENNESSEE VALLEY WAS POISED TO BECOME A NATIONAL LABORATORY FOR ENVIRONMENTALLY SENSITIVE ENERGY USE, AND LAND AND WATER DEVELOPMENT. I DON'T THINK WE'RE STILL IN THAT SAME ADVANCED GUARD, AND WE SHOULD BE. NOW MORE THAN EVER.

EVEN IN THE EASTERN BLOC, NATION AFTER NATION IS LOOKING TO DEVELOP TECHNOLOGIES THAT USE NATURAL RESOURCES WITHOUT ABUSING THEM OR DEPLETING THEM. THE SENATE'S PASSAGE OF THE CLEAN AIR ACT EARLIER THIS YEAR MAY VERY WELL MEAN THAT THE 1990'S WILL BE THE SECOND DECADE OF THE ENVIRONMENT HERE IN THIS COUNTRY.

TVA HAS THE TRADITION AND THE MANDATE TO PUSH THE TENNESSEE VALLEY TO THE FORWARD FRONTIER OF THE NEW ERA OF

ENVIRONMENTAL SENSITIVITY. I KNOW THAT THE FERTILIZER INSTITUTE HAS NOW BEEN REORGANIZED TO FOCUS SOME RESEARCH ON ENVIRONMENTAL ISSUES. BUT, AGAIN, I'M FEARFUL THAT TVA HAS NOT CLEARLY ARTICULATED ITS ENVIRONMENTAL AGENDA FOR THE 90'S.

"EARTH DAY" WEEK, IN MY JUDGMENT, GIVES US A GOOD OPPORTUNITY TO RE-FOCUS AND RE-ENERGIZE TVA'S ENVIRONMENTAL MISSION.

I CHALLENGE YOU TODAY TO USE THE MUSCLE SHOALS CENTER TO DEVELOP BY THE END OF THIS YEAR A COMPREHENSIVE TEN-YEAR PLAN FOR TVA'S ENVIRONMENTAL PROGRAMS. THE PLAN SHOULD INCLUDE THE WHOLE RANGE OF ENVIRONMENTAL ISSUES, INCLUDING WATER QUALITY, AIR QUALITY, AND WASTE MANAGEMENT -- INCLUDING THE PROMISING NEW REFUSE DERIVED FUEL TECHNOLOGY. I BELIEVE THE DEVELOPMENT OF SUCH A PLAN WOULD HELP TVA ACHIEVE ITS GOAL TO PROVIDE NATIONAL LEADERSHIP IN THIS "DECADE OF THE ENVIRONMENT."

WE IN CONGRESS WILL TRY TO HELP YOU ACHIEVE THAT GOAL AND THE OTHER OBJECTIVES YOU'VE LAID OUT FOR THE 90'S. ONCE AGAIN, OUR JOB HAS BEEN MADE HARDER BY THE BUDGET REQUEST WE ARE CONSIDERING TODAY. FOR EXAMPLE, THE FERTILIZER AND ENVIRONMENTAL CENTER IS ONE OF SEVERAL IMPORTANT PROGRAMS THREATENED BY THE PRESIDENT'S PROPOSED CUTS IN TVA'S BUDGET. THOUGH PRESIDENT BUSH HAS BEEN A BIT KINDER AND GENTLER TO TVA THAN HIS PREDECESSOR, HE NEVERTHELESS HAS PROPOSED A MAJOR CUT FROM LAST YEAR'S APPROPRIATED AMOUNT. I THINK TVA HAS ALREADY SUFFERED ITS FAIR SHARE OF CUTS. I INTEND TO WORK HARD TO SEE THAT WE MAINTAIN LEVEL FUNDING FOR TVA THIS YEAR.

NOW, I'D LIKE TO TURN TO CHAIRMAN RUNYON AND THE DIRECTORS AND GET THEIR PERSPECTIVE ON THE PRESIDENT'S BUDGET PLAN AND THEIR VIEWS ON TVA'S MISSION IN THE IMPORTANT DECADE AHEAD.

SUMMARY STATEMENT

Mr. **Runyon**. Mr. Chairman, thank you for those kind remarks that you have just made. We accept your challenge, and we will develop the plan that you referred to. As a matter of fact, on Monday we have scheduled a 3-day meeting with all of our management committee to start working on what our strategies will be for the nineties, and this will certainly be the first strategy that we will work on.

We are here today to present the administration's budget request for the Tennessee Valley Authority for fiscal year 1991. A copy of the budget request has been submitted to you for the record. The administration is asking $91.3 million. Today we want to give you a brief overview of what we did last year and where we see TVA headed in the 1990's. TVA has made great progress in the last few years and we see a bright future.

Last year, we met the second year of our 3-year rate stability goal which means a saving for every resident and business in the Tennessee Valley region. This year we expect to meet the third year of our goal and TVA's top managers have challenged themselves to extend our rate stability goal for at least a fourth year.

We have continued to make TVA more streamlined and competitive and the people of the Tennessee Valley have benefited from a 30-percent reduction in overhead costs in our appropriated programs. Refinancing our long-term debt last year will save TVA power customers almost $150 million each year in interest payments. Last spring, our flood control staff prevented $4 million in potential flood damage from record rains. We achieved record power production in 1989 from our Sequoyah nuclear plant and our fossil plants continued to be among the most efficient and productive in the world.

AGENDA FOR NEW DECADE

As we now enter a new decade, we see even more opportunities for TVA to renew its mission of helping to improve the quality of life for the people we serve. In the 1990's we are concentrating on five areas: First, providing environmental leadership; second, stimulating economic growth; third, emphasizing service to customers and communities; fourth, maintaining a quality work force and workplace at TVA; and, fifth, achieving excellence in nuclear power operations.

Mr. Chairman, this is our agenda for the 1990's.

Now, let me provide some details about what we expect to achieve. First of all, we will strive for environmental leadership, and that means going beyond mere compliance with laws and regulations. Leadership means helping to solve problems in innovative ways and demonstrating to others how environmental challenges can be met. Earlier this year we changed the name of TVA's National Fertilizer Development Center to the National Fertilizer and Environmental Research Center. This change in name really underscores the change in program emphasis that has taken place at the center. TVA will continue to take a leading role in working with farmers and developing and testing environmentally safe ways to improve soil fertility.

But the contributions of TVA researchers already extend beyond agricultural applications. Symbolically, the name change reflects a broader concern for environmental matters in every area of TVA's responsibility. TVA has always been a national laboratory for a wide range of environmental concerns. Today we are helping to solve a variety of air, water, land, and waste management problems.

For example, as one of our Nation's largest consumers of coal TVA is a leader in developing and testing pollution control and clean coal technologies. We have cut our sulfur dioxide emissions in half and reduced particulate emissions by 93 percent. All of our plants are in compliance and the regulated emissions at most of the plants are well below the levels allowed.

The second area we are focusing on in the 1990's is stimulating economic growth. We are basing our business operations and planning in helping to encourage quality economic growth and create jobs. Stabilizing power rates has already provided a boost to economic growth. Since we announced TVA's rate stability goal, more than 900 firms have made plans to locate or expand in the Tennessee Valley, and that adds up to $7.5 billion in new investments and more than 55,000 new jobs. We have also introduced rate incentives that are tied to the number of jobs created.

Our third area of emphasis for the 1990's stresses service to our customers through a consumer-first philosophy that is practiced by all TVA employees. That means we will not take our customers, communities, or other constituencies for granted.

Last year, for example, we continued to improve our record of reliability in transmission service providing power to our customers more than 99.99 percent of the time. And even when service was interrupted, the average time out of service was only about 13 minutes. We achieved that level of reliability even though a series of tornadoes in north Alabama last November inflicted the second largest amount of damage ever on our transmission system.

During our disaster relief operations I went to north Alabama to meet with State and local leaders, TVA power distributors, and our emergency crews. Many of those crew members worked 36-hour shifts in snow and freezing rain, and while they were restoring power to our customers, they were providing a working definition of customer service for all of us.

QUALITY WORK FORCE

Our fourth area of focus in the 1990's is maintaining a quality work force and workplace at TVA. That means stabilizing our work force, expanding employee involvement, and improving productivity.

We have already gone a long way toward achieving excellent, efficiency, and productivity at TVA, but we must do more. TVA must be recognized as an excellent place to work where employees are committed to their jobs, their work is challenging, and the work environment is inviting.

We have already established new compensation policies that are helping us attract and retain highly qualified staff. We are implementing a new management philosophy and we are working on long-range strategies for labor relations and minority development.

We are also considering a flexible benefits package, dependent care programs, and fitness centers among others. We are determined to make TVA the most competitive electric utility in North America and the most efficient and productive agency in Federal service, and we will do it with the help of our highly committed employees.

Finally, TVA's fifth area of focus in the nineties is achieving excellence in nuclear power operations. That means operating TVA's plants in a safe, efficient, and quality manner; earning the public's confidence is essential to our success in nuclear power.

POWERPLANT OPERATIONS

Our hydro and fossil plants continue to be among the top powerplants in the Nation, and our goal for TVA's nuclear plants is to be among the top performers in the industry. Both reactors at our Sequoyah nuclear plant set performance records last year and that reflects the quality of our recovery program. In fact, in a global comparison of nuclear plants that generated the most electricity last year, unit 1 at Sequoyah ranked second in the United States and eighth in the world.

This year we are working to return another reactor to service at Browns Ferry nuclear plant. We expect all TVA's nuclear plants to be as efficient and reliable as the best in the industry and above all, we expect them to be safe. Nuclear power also is making a valuable contribution to our clean air initiatives.

If TVA had built coal-fired plants instead of nuclear plants for additional capacity, our sulfur dioxide emissions would be about 1 million tons higher each year, or almost double current emissions.

Mr. Chairman, by focusing on the areas I have mentioned, TVA is helping the people of the Tennessee Valley and the Nation to meet the challenges of this new decade. And in making those contributions I am confident that we will reach our goal of being the most competitive electric utility in North America and the most efficient and productive agency in Federal service.

We realize that these goals are ambitious, but we are convinced that they are realistic, and with the support of Congress and the citizens we serve, we will achieve them.

PREPARED STATEMENT

Mr. Chairman, we greatly appreciate the support that members of this committee and your colleagues have shown to TVA in the past and we will work hard to continue to merit your support. Your ongoing interest in our programs is a real expression of your concern for the needs of the people of the Tennessee Valley and the Nation.

On behalf of TVA and all the people we serve, thank you.

[The statement follows:]

STATEMENT OF MARVIN RUNYON

Mr. Chairman, we're here today to present the Administration's budget request for the Tennessee Valley Authority for fiscal year 1991. A copy of the budget request has been submitted to you for the record. The Administration is asking for $91.3 million. Today, we want to give you a brief overview of what we did last year, and where we see TVA headed in the 1990's.

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On behalf of TVA and all the people we serve, thank you.

STATEMENT OF JOHN B. WATERS

Senator **Sasser**. Thank you very much, Mr. Chairman. Do any of the other Directors have any remarks at this time?

Mr. **Waters**. Thank you, Mr. Chairman. I would like to, before I commence my remarks, join Marvin in thanking you for your kind remarks and especially your kind remarks about our colleague, Chili Dean, who is here in his last Senate hearing and we have enjoyed serving with him. We are going to miss Chili.

Senator **Sasser**. He may see this last Senate hearing as a measure of some relief that he does not have to come back up here any more.

Mr. **Waters**. I suppose that is a possibility. [Laughter.]

Mr. Chairman, in his State of the Union address the President reminded us that one of the most important legacies we owe future generations is the safekeeping of America's precious environmental inheritance.

We appreciate the work of the members of this committee and your congressional colleagues in providing legislative leadership on environmental issues. At TVA we do take our environmental responsibilities seriously. In fact, as Marvin has just explained, the environment is one of our top priorities for the nineties.

Today, we have strong programs in air, land, and water resources. I was privileged to represent the TVA Board here in Washington earlier this month when TVA representatives showcased some of these programs at the National Earth Tech '90 exhibition.

One of our most critical concerns and one that has become my personal priority as a TVA Director is finding ways to better manage the Tennessee River system for the maximum benefit of all our people. We are committed to making the Tennessee River and its tributaries the best managed river system in the world.

Mr. Chairman, allow me to briefly summarize some of the things we are doing to achieve that goal. Over the last couple of years, we have been conducting the most comprehensive study in 50 years in the way TVA operates the river system. We released a draft of that study titled, "The Lake Improvement Plan." We have held public meetings across the State and across the valley and we have sought written comments to help guide our final decision. We have worked very hard to have good public relations.

Under the original TVA Act, navigation, flood control, and power production were the primary purposes for our river system. Over the years, water quality, recreation, and economic development have become increasingly important in the Tennessee Valley and along the river system. Today aquaculture, water supply, aquatic habitat, irrigation, and powerplant cooling are major concerns that were given very little attention in the early days of the Authority, so we commissioned a study to see if new operating priorities were needed. The plan contains a number of alternative management proposals affecting water quality, lake levels, recreation, and economic development. Even though the plan is still in draft, it has been broadly distributed and I am told is altering the way other Federal and State agencies view water policy.

ENVIRONMENTAL CONCERNS

Mr. Chairman, if we expect the Tennessee River system to be the best managed in the world, we have to solve the problem of low dissolved oxygen and nonpoint source pollution in the river. We have taken some important steps along this line. We are testing several highly innovative techniques to put oxygen back into the waters below our dams. We also have several projects demonstrating how to contain potential nonpoint source pollution. These demonstration projects encourage others to try the techniques themselves.

Navigation raises another serious concern that we must address. Navigation is expanding on the Tennessee River, due in large part to the opening of the Tennessee-Tombigbee Waterway. Unfortunately, opportunities to move cargo in and out of east Tennessee are hampered by small locks on the three upstream dams. Barge delays are growing steadily worse. We estimate that by the year 2000 the average tow will have to wait more than 3 days at Chattanooga just to get through the Chicamauga Lock.

TVA is also monitoring water quality, studying the impact of air pollutants on our lakes, controlling aquatic weeds and insects, and offering flood control assistance. These are just some of the activities we are undertaking to make the Tennessee River system the best managed river system in the world and many of the techniques we are developing can be applied in our region, across the Nation, and, indeed, around the world.

Overall, we believe that TVA has done a good job in managing the Tennessee River and the tributaries for the past half century. We have learned a lot of important lessons. We have shared what we have learned and we are applying those lessons to the problems of today. TVA is a national laboratory. We test new ideas; we make them work. Then we pass the results on to others.

PREPARED STATEMENT

Mr. Chairman, we appreciate the fact that in this committee's support of TVA's work you have not simply been approving another item in the Federal budget. You have taken an active role. You have made a continuing investment in the search for a better way of life. And the benefits are not limited to the seven States of the Tennessee Valley region, but shared with America and the world.

Thank you very much, sir.

[The statement follows:]

STATEMENT OF JOHN B. WATERS

Thank you, Mr. Chairman. In his State of the Union address the President reminded us that one of the most important legacies we owe future generations is "the safekeeping of America's precious environmental inheritance. We appreciate the work of the members of this Committee and your Congressional colleagues in providing legislative leadership on environmental issues.

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Mr. Chairman, we appreciate the fact that in this Committee's support of TVA's work, you have not simply been approving another item in the Federal budget. You have taken an active role and made a continuing investment in the search for a better way of life. And the benefits are not limited to the seven States of the Tennessee Valley region but are shared with all America and the world.

Thank you.

STATEMENT OF C.H. DEAN

Senator **Sasser**. Thank you, Director Waters.

Do you have a statement at this time, Mr. Dean?

Mr. **Dean**. Yes; I have a brief one, Mr. Chairman.

As you mentioned earlier this morning, my term on the TVA Board expires next month, and your kind remarks are certainly appreciated. It has been a historic 9 years for TVA. At times it has been very stressful, at times exciting, but always rather fascinating.

Most of our problems in the eighties were centered on our nuclear program and these problems received so much attention that they overshadowed many of the good works that the agency has been involved in throughout the valley. Since most of our budget comes from power revenues, it is easy to think that the small percentage that comes from appropriations is inconsequential, but it is our appropriated programs that define TVA's character as one of the best known and one of the most successful resource development agencies in the world.

APPROPRIATED PROGRAMS

Let me mention briefly three examples that demonstrate where TVA had made a difference with the appropriated programs. Each example in its own way is making an important contribution to our Nation's heritage.

For more than 10 years, TVA's environmental education program has been setting up a network of university-based centers which help students learn to use resources wisely. The network is reaching thousands of schoolchildren every year.

Another progressive example is the stewardship programs reintroduced into our budget during the last 2 years. TVA's lands and facilities are part of our legacy to future generations and they belong to the people of the United States. Thanks to you and your congressional colleagues, we are now able to make some badly needed repairs and improvements to the Federal properties entrusted to us. With the continuation of these stewardship programs, we will be able to pass on to the next generation a legacy of real and enduring value.

This week I have been down to Muscle Shoals and they are actually tearing down old fertilizer installations that were built in 1918 to make room for things that will represent more of the wave of the future.

Finally, I want to mention the bald eagles at the Land Between the Lakes. Over the years TVA has helped return a variety of species to the wild, but of all these projects one of the most exciting has been the restoration of the bald eagles to the Land Between the Lakes. Forty-four eagles were raised from captivity and released during TVA's 8-year program. Many of them nested. This winter our resident population was more than 150 birds. One of the Kentucky nests was the first successful nest in the State known to produce offspring in 40 years.

The bald eagle, of course, is the symbol of this great Nation. To see the eagle once again soaring over the lakes and the fields of the Tennessee Valley gives us great hope for a brighter tomorrow for all America.

Mr. Chairman, each of the appropriated programs I have just mentioned exists because members of this committee and others in Congress have taken a strong interest in them. TVA has made a difference through programs like these and because of your help. They are as much your legacy as ours. We are certainly grateful for the support you have given us over the years, and although this is my last appearance before you, I will continue to watch the work of this important committee with a lot of interest and wish you the best in years ahead. Thank you.

PREPARED STATEMENT

Senator SASSER. Thank you very much, Mr. Dean. We appreciate your statement and observations very much.

[The statement follows:]

STATEMENT OF C.H. DEAN, JR.

Good morning, Mr. Chairman, and members of this Committee. My term on the TVA Board expires next month. It's been a historic nine years for TVA—at times stressful, at times exciting, but always fascinating.

Most of our problems in the 1980's were centered on our nuclear program, and these problems received so much attention, they over-shadowed the many good works that the agency was involved in throughout the Valley. And since most of TVA's budget comes from power revenues, it's easy to think that the small percentage that comes from appropriations is inconsequential. But it's our appropriated programs that define TVA's character as one of the best known and most successful resource development agencies in the world. Let me briefly mention three examples that demonstrate where TVA made a difference with its appropriated programs.

Each example in its own way is making an important contribution to our Nation's heritage. For more than ten years, TVA's environmental education program has been setting up a network of university-based centers which help students learn to use resources wisely. The network is reaching thousands of school children every year.

Another progressive example is the stewardship programs reintroduced into our budget during the last two years. TVA's lands and facilities are part of our legacy to future generations. They belong to the people of the United States. Thanks to you and your congressional colleagues, we're now able to make some badly needed repairs and improvements to the Federal properties entrusted to us. With the continuation of our stewardship programs, we will he able to pass on to the next generation a legacy of real and enduring value.

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Although this is my last appearance before you, I will continue to follow the work of this Committee with great interest and wish each of you well in the years ahead.

Thank you.

PROGRAMS IMPACTED BY FISCAL YEAR 1991 BUDGET

Senator SASSER. Mr. Chairman, I noted that the environmental research center would be cut back if we adopt the budget that has been proposed by the administration. Could you summarize this morning the other programs that would be reduced or eliminated as a result of the proposed funding level that the administration has proposed for the Tennessee Valley Authority?

Mr. RUNYON. Yes, sir; I will do that.

There are many programs that would be cut back or eliminated, and I would like to submit for the record a complete listing. But I would like to go through some of the things that would be examples of what would happen.

The reservoir water quality assessment resources would be cut by one-half. When our monitors identify a water quality problem, this work determines the cause and helps us find the solution. We would have to cease further studies on replacing locks on the upper Tennessee River.

Congress specifically directed TVA to continue this work in fiscal year 1990. We would be forced to eliminate all national demonstrations, cooperative research, and training efforts at Land Between the Lakes, including all teacher and student training and environmental education programs.

We would have to cancel all rural development work including all job creation and skills development activities and technical assistance in municipal waste reduction and management. We would have to eliminate our environmental research and development work with fertilizers and other farm chemicals. We would no longer be able to help farmers use these chemicals in a way that reduces nonpoint source pollution.

Senator SASSER. Now, we said nonpoint solution——

Mr. RUNYON. Pollution.

Senator SASSER [continuing]. Or pollution.

Mr. RUNYON. Yes.

Senator SASSER. I think Mr. Waters said in his testimony it is one of the principal problems we have got in the Tennessee Valley waters and streams.

Mr. RUNYON. That is right. This would—without the funds—stop.

This is a representative list, but I could go a little bit further in the——

Senator SASSER. Let me just ask you this, Mr. Chairman. What level of funding did TVA request initially from the Office of Management and Budget? Also, what new or existing programs did you intend to apply that funding to? In other words, what did you request when you went before OMB and what were you going to do with that money with regard to new programs?

Mr. RUNYON. We requested $142.4 million.

Senator SASSER. How much did they give you?

Mr. RUNYON. $91.3 million.

Senator SASSER. Yes.

Mr. RUNYON. The $91.3 million compares to what we actually received from Congress last year, $121 million. They actually gave us $12.5 million more for stewardship, which is a very badly needed operation with us. But there was $6.0 million less in water and land, $1.0 million less for Land Between the Lakes, $20 million less in rural development, and $12.9 million less in national research. This is compared to the $121 million for fiscal year 1990.

Now, what we asked for in the way of new initiatives this year was, No. 1, additional stewardship funds for which we needed about $10 million.

STEWARDSHIP FUNDS

Senator SASSER. What do you do with those stewardship funds?

Mr. RUNYON. That is to bring our equipment and facilities back up to where it should be. In the past years we have been receiving, until last year, about $103 million. We were using those funds primarily for the programs and not for maintenance of facilities and equipment that we have.

We have a lot of roads, for example at Land Between the Lakes.

Senator SASSER. This is principally infrastructure, maintenance, and upgrading work?

Mr. RUNYON. Yes, sir; that is exactly what it is for, and we need that money to put it all back in place. We have a 5-year program that would take $100 million to put that back in place. Last year we asked for and got $10 million and this year we are asking for an additional $10 million to get the facilities back in shape because if we do not get them in shape, we will lose them totally, and that is a very expensive route to take.

The Pickwick Channel modifications that we planned to do would be added in at $3 million, plus $500,000 to adapt to our global climate change studies, reclamation for watershed protection, and implementation of our LBL development plan.

Senator SASSER. You say reclamation for watershed protection. Is TVA trying to prevent soil erosion?

Mr. RUNYON. Yes, sir.

Rural schools in crisis, building family self-sufficiency, rural solid waste management which is a very important thing for this country, not just the Tennessee Valley, but for this country are other concerns. We need to be on the leading edge of demonstration projects there.

Senator SASSER. I want to ask you about that in just a moment. Go ahead.

Mr. RUNYON. And then agricultural and environmental research and development is a very important thing, and we had additional money in there for that.

So, those were the things that we had added in. Now, the other moneys that increased was the 4.5 percent for economic increases which happen. I mean, the cost of doing business goes up, and it was estimated 4.5 percent this year in our budget.

NONPOINT SOURCE POLLUTION

Senator SASSER. Let me back you up a moment, and I will direct this question to you or maybe Mr. Waters, whichever would be more comfortable answering it.

On the question of nonpoint source pollution, your funding has been cut for dealing with that problem. Is that what I understand?

Mr. RUNYON. Yes; it has been cut, and we had asked for more.

Senator SASSER. Well, now, nonpoint source pollution is responsible, I am told, for 80 percent of the surface water pollution in the State of Tennessee, and Mr. Waters said in his statement, as I recall, that the real problem in the Tennessee Valley waterway system is nonpoint source pollution; is that not correct?

Mr. WATERS. That is correct, Mr. Chairman.

Senator SASSER. And that is——

Mr. WATERS. It is a concern not only in the valley, but all the way across the Nation. It is a big problem and we are going to have to learn how to do a lot more.

Just one example. We all are familiar with the big shopping areas and the blacktop parking lots—they are all over the country. The runoff from those areas are a significant contributor to nonpoint pollution.

And what we are having washoff from streets and roads and blacktop parking lots, urban areas in general. Then when you think you move to the rural areas, and the agricultural communities does not manage livestock waste like they used to, so livestock wastes have become a significant contributor to pollution in our streams. They go into our creeks, the creeks go into the rivers, and the rivers into the lakes.

Senator SASSER. And the livestock waste is just raw—is equivalent to raw sewage is what it amounts to.

Mr. WATERS. Absolutely. And it puts these nutrients in the water that cause all kinds of water quality problems that affect fish habitat, clog streams, intake valves. It has a dramatic effect on municipal water. And we are talking about water that we drink and use in food preparation as well as not considering the recreational and other uses of that water.

So nonpoint pollution is a very important factor. As you say, 80 percent.

Another area that worries me—and I have been watching it for years—are septic tanks. It has been estimated that about three-quarters of the septic tanks in the valley—and I think this would be true in the Nation—are probably defective. They probably do not work well. They probably are contributing to nonpoint source pollution. That may be the major cause of nonpoint pollution, and it is just something that we are very concerned about in the Tennessee Valley.

And, Mr. Chairman, this Board is going to do everything it can do, I will assure you, to not let the problem ruin the Tennessee River system.

Senator SASSER. So, clearly this is an area where, rather than cutting back, it appears to me we ought to be adding additional resources.

Mr. WATERS. I think so.

REFUSE-DERIVED FUEL ACTIVITIES

Senator SASSER. Well, the committee will certainly keep that in mind as we go through this budget.

Mr. Chairman, as you know, I attached an amendment to the recently passed Senate clean air bill. My colleague, Senator Gore, joined with me in that in directing that the Tennessee Valley Authority develop and submit a plan for the burning of refuse-derived fuel. I think the abbreviation of that is RDF. Everything has got to have an abbreviation these days.

Anyway, I am a strong supporter and advocate of this promising new program. As you say solid waste and solid waste disposal is one of the greatest problems we have not, not only in the Tennessee Valley area, but all across the Nation. And as I go across our State of Tennessee, every county executive or every mayor without fail will bring up the problem of solid waste disposal, what is to be done about it, can we get some funding to help us with this problem, can we get some legislation to help us with this problem, et cetera.

Now, I would really like to see the Tennessee Valley Authority be a national leader in developing, in testing the effectiveness of burning or combusting this fuel that is derived from solid waste, so-called refuse derived fuel, and I know that you have done some research on RDF at the National Fertilizer and Environmental Research Center, Muscle Shoals.

Could you discuss some of the research that the TVA has done on this problem under your direction and give us the status of this research and your overall efforts in this area.

Mr. RUNYON. We have two avenues that we are pursuing in the RDF right now, or solid waste I guess I should say. One is at the Muscle Shoals Research Center. We have a biomass project down there where we are working on taking hardwood and turning it into ethanol. We now have directed staff to take that project and use solid waste instead of hardwood.

Senator SASSER. Solid waste to develop the ethanol instead of the hardwood?

Mr. RUNYON. Yes, sir; and it would develop ethanol and acetic acid would be the two products that would come out of the process, plus a clean cellulose that could then be burned. We are studying that.

We also are actively pursuing how would we set up an entire process to handle RDF from an area. We have a draft study. I will give you a copy of our most recent draft of that. But what we are looking at now is how do we go about forming consortiums of city, county, State, ourselves, individual companies who would supply equipment to actually do the processing.

This is something like we did with the atmospheric fluidized bed combustion chamber in Kentucky as you know. We had Duke Power, TVA, EPRI, other manufacturers, the State of Kentucky—all invested money—in a project that cost over $200 million and came up with a new clean coal-burning process.

And what we are looking at now is to get a consortium of people and all of those who are interested to invest in this program. Once we get the process done, then we would, in TVA, in the power program, set up a facility to handle and process that RDF, which would be the outcome of this consortium, into energy. And we think that this is the best approach. We need to work out what is the best way to do this, and we think we are well on the way to coming up with a solution.

Now, this is not an easy or fast solution. The fastest that this has been done in the industry, they tell us, is around 72 months. We have a plan. Right now our draft plan says we might be able to get there by 52 months. So we are looking at that in that fashion.

We also recognize that we cannot expect the customers who receive this power to pay more for power because we are using RDF for fuel. Under the TVA Act we are obligated to provide power to the residents of the Tennessee Valley at the lowest possible cost, so we have these two things working together.

What we need to do is to work them both together so we solve both problems at the same time. We think we are making good progress. We appreciate very much your interest and Senator Gore's interest in your amendment because that is very helpful for us to get that kind of support. It makes everybody that we deal with know that you have placed a high emphasis on it, that we have a high emphasis on it, and everyone gets a little more interested in accomplishing the goal.

Senator SASSER. Well, now, Mr. Chairman, in the preliminary reports that have been made by TVA regarding a potential RDF project, the report makes reference to a facility that would burn 1,000 tons of RDF per day.

Now, presently in the State of Tennessee we produce less than one-tenth of that amount of RDF per day. We now produce less than 100 tons a day, and we are talking about—your report is talking about building a facility that would consume 1,000 tons a day.

Now, my question is, Would it be wiser, perhaps, and less costly, to build a pilot plant to determine how effective the whole RDF program would be rather than going forward and building a large facility?

I can tell you one thing I have learned from my travels in the Soviet Union—start out small and perfect that before you go on to the big central facility. Once you get a large facility constructed and the problems are in, it is much, much more difficult to correct them.

How do you respond to that idea—starting with a smaller pilot project rather than going with a large facility to start with?

Mr. **Runyon**. It is possible to start with a smaller system, say 500 tons or less. We are looking at a range of sizes.

And, you know, when you start getting too low, then you really cannot prove it out. That is why we went with the atmospheric fluidized bed combustion chamber in Kentucky with 160 megawatt load, and we are having some startup problems with that. We are learning about how we should do that and we are not through with our study. The study may well tell us, hey, do 10 tons. But that is an awfully small amount.

Chili was just telling me he was down at Muscle Shoals and was looking at this biomass thing and the way they are doing that down there now is—well, why do you not explain that, Chili.

Mr. **Dean**. Well, I think the point is you have to start out, as you point out, very small. As a matter of fact, some of those processes are still in the lab, and the container they were using to ferment the garbage, after it has gone through certain preliminary processes, is about 3 or 4 feet high, and is stainless steel. So, it is a long way from there to what we are going to need to deal with the waste of even one city.

Senator **Sasser**. Gentlemen, I will just tell you, if we can come up with a way, an environmentally safe way to combust this solid waste, then I think every mayor and county executive in the State of Tennessee will want to pin the Congressional Medal of Honor on all three of you, because it is the No. 1 problem.

Mr. **Dean**. Senator, I might add one quick thing to that. It is obvious that we are going to run out of landfills. We all agree, and they are going to be harder to manage than they ever were before.

Senator **Sasser**. Just about out.

Mr. **Dean**. I think the problem we have is that people really do not understand that this is, regardless of how environmentally sound, is going to cost more to dispose of our waste than it does to go out and dump it into a hole in the ground.

RDF COSTS

Senator **Sasser**. That is correct. It is going to cost more, perhaps, in the short term. I think you can make a strong case in the long term it probably does cost us more to dump it in the ground. But in the short term, it is going to cost us more to combust it. I do not think there is any doubt about that. But I think that is the way that in my view we need to go.

In the press reports following the passage of the amendment dealing with the RDF, TVA has suggested that all or some of the money to build an RDF is going to have to come from the nonpower appropriated budget.

Now, you are presenting here today on behalf of the administration a budget that does not propose any new programs, eliminates many important existing programs as we have discussed earlier, and we have to fight every year just to keep our head above water and maintain the status quo in funding for Tennessee Valley Authority budget.

Now, in light of that fact and the evidence that the RDF is less costly than coal and produces some scientists say—in fact, most scientists that I have read say less environmentally harmful emissions.

Why should you not consider developing a pilot plant exclusively through the power program—in other words, paying for it with power revenues?

Mr. RUNYON. Well, what we are looking at is that we would construct the plant with power funds once we get through with the feasibility study and research on alcohol production. That is what our program is now.

We think that there are many people who are very interested in this, and I am talking again about cities, counties, and States who also have this problem. As you say, they would be very thrilled to have this because as I go around the valley, I have people come to me and say, you know, you have got to help us with our solid waste.

And we have many ways of helping people with solid waste. For instance, recycling, which is, you know, the first thing you have to do even if you don't go to RDF. We need to get people to do the things that we know how to do now, which is to recycle and reuse, take out the grass clippings and the tree limbs and handle those so we can get it down to where what we are talking about combusting might only be 40 or 50 percent of the total waste stream. So that all has to come first, and that takes involvement by other people in addition to what we are going to do to combust.

So I think that by getting the interested people involved in a consortium will really help us to put together a material and energy recovery system. Then TVA will invest the money to build the facilities to take care of the combusting.

TVA RECYCLING PROGRAM

Senator SASSER. Now, your point about recycling being sort of a condition precedent or something that needs to be done in a preliminary way is a point well made. In one of my other hats I wear as chairman of a subcommittee on the Government Affairs Committee is the Subcommittee on General Services that deals with a number of the Federal agencies, and I am interested in seeing Federal agencies take a lead in the whole concept of recycling.

I am currently working on implementing new recycling policies for the Federal Government. What recycling policies does TVA have in place at the present time, Mr. Chairman, and what do you anticipate for the future?

Mr. RUNYON. We have recently instituted in all of our offices and installations that we have around TVA a recycling policy involving paper, cans, and things of that nature that are used in those facilities. Of course, our plants use recycled things like copper and aluminum and things like that because it is very cost effective.

But we recently started a very strong drive with paper because paper takes trees, and we do not think that is a good way to do business. TVA has done this before, but it is one of those programs that we have done, and then it just kind of eased away as many good programs do. We are putting it back in place.

Senator **Sasser**. We are going to be looking over your shoulder here about your recycling efforts because we need, the Federal Government and all Federal and quasi-Federal agencies—and I would classify TVA as a quasi-Federal agency—needs to take the lead in this whole recycling problem and be part of the solution and not a part of the problem.

Now, I have been bragging about a lot of things you have been doing and I want to say something on more of a negative tone now.

ENERGY CONSERVATION

I am frankly disappointed that TVA has decided to eliminate its energy conservation program. We have got all sorts of environmental problems. We have consumers in the Tennessee Valley area that even though the rates have stabilized still have a very, very difficult time, particularly in the winter, in paying their power bill.

And I would like to urge TVA to move back in the direction of energy conservation and not adopt sort of the popular power provider culture of trying to sell as much electrical power as you can. Sort of take the attitude the dentist took years ago, you know. They took the lead in trying to get fluoride put into water so that children would not have cavities in their teeth.

Some said the dentists were putting themselves out of business. Perhaps they have hurt their business a little bit because kids do not have cavities anymore, but they found something else to do, and they are doing just as well, and I would like to see TVA take the lead once again in energy conservation. I think that is the wave of the future. I think it is something that needs to be done and let us face facts. You are going to have as much demand for the power that you produce as you can handle in a few short years.

I think we are moving into an age. The decade of the 1990's is going to be known, I believe, as the age of electrical energy shortage because nobody has been building any new capacity now for about 10 or 15 years, and TVA is sitting on, when you get all of those nuclear plants up and running, you are going to be sitting on excess capacity— at least I believe you are. You are going to be close to it.

Do you disagree with that, Mr. Chairman?

Mr. **Runyon**. Our plan for bringing those back on will keep us at about a 24-percent over capacity factor which is a good margin to have. Any less margin than that is a problem and our growth, as we see it in the Nation, is going to be about 2.8 percent per year.

And, what we are doing, as we bring back the nuclear plants is, we are meeting that demand. I agree heartily with you that there is going to be severe shortages in this country on power because new powerplants are not going into place. I think that we need to get about our business and get those new powerplants in place.

Now, as we bring back on line our units, we will just meet our demand. Another thing that we have to do in the next 2 years or 3 years at the most is to decide what the next powerplant we are going to build will be. As I said, in the year 2000 we will be still OK from a margin of safety operation, but past that point—if this growth continues and today it is predicted that it will—we will need to have more power out there available.

ENERGY SUPPLY SOURCES

And so we have got three sources. We have got hydro, but I do not know how we are going to get much more hydro out of what we have now. We have fossil power and we have nuclear power. And, at the present time, the technology needed to bring fossil power within the proposed clean air laws will be a very expensive venture.

There is no one today who would agree to start a nuclear powerplant but I think that we all need to work together to come up with a nuclear plant, 600 megawatts probably, because that is a good economic size, because it is good to operate, because it is not too large. We need to have a standard plant so that anybody who is going to build a nuclear plant builds a plant to that specification, and only that specification, so that we can take operators from Seattle and move them to North Carolina to operate the plant and not take 2 or 3 years to relearn how the system operates. And I think we need to get that done.

Then we could build a nuclear plant in 5 years instead of 13 to 20, which is what it is taking now. Time is money when you start to investing $5 billion, or however much it is, you are going to put into a plant. Every day you have that money and it is not producing, then it is costing you money. And so if we can get that done, then that would be a very good thing to happen. That agenda should be done in 2 or 3 years because we need to make a decision as to what we are going to do. To put a fossil plant on stream today would take us at least 7 years. To put a nuclear plant on stream today——

Senator SASSER. Could take forever.

Mr. RUNYON. I do not know. We have got some that we have been building on what, 16 years? And one plant that we have got that we have had for 16 years—and, by the way, one of the reasons we are going to continue on and build that plant is because of the investment we have tied up in it. And we need to put that investment in another—not near as much investment—so that it will operate and serve the people of the valley for 40 years and give us power. So, those are some things that we really need to be looking at.

Senator SASSER. Well, I could not agree with you more. If we come to the point where new capacity is going to be supplied primarily by nuclear—and I do not know whether that is going to be the case or not, we certainly need to standardize on the nuclear powerplant, and certainly you make a strong case. That is the most cost-efficient way to go at it. It is the safest way to go at it.

Mr. RUNYON. And from the environmental standpoint, it is the cleanest way to go.

Senator SASSER. But I want to return to my chief point. You make a case, really, for energy conservation, Mr. Chairman, because if we are moving down the road where at some point in the not too distant future TVA is going to be bumping up against its capacity, then the other regions of the country, most of them, are going to get there a lot sooner than TVA does, and I can envision a time in the not too distant future when there is going to be pressure on TVA to wheel power out of the Tennessee Valley region up into other areas in the Northeast, the Midwest, etcetera.

And so I just say all of that by way of coming around to encouraging you to take another look at your energy conservation program and plans because I think that is something that you need to rekindle your interest in my judgment in energy conservation.

Mr. Dean, you are leaving and this is your last appearance before the subcommittee this morning, and I would like to get some observations from you as you leave. You are probably in a position now to speak your mind as freely, probably more freely, than you ever have been. There have been a lot of changes at TVA during your tenure and you have been involved in some very important issues.

As you get ready to leave the Board, what do you see down the road for the future of the power program? What kind of problems do you think we can expect to encounter over the next decade?

FLEXIBILITY OF TVA BOARD

Mr. Dean. Mr. Chairman, I would respectfully suggest that the TVA Board has got in their hands the operation of one of the largest power systems in the world, and I want to say this very respectfully, but the more they are allowed, the more freedom they are allowed to do what they need to do to run it properly, the more likely they are to succeed.

We have had to make some drastic changes down there. Since 1985 we found we did not have enough qualified managers to run our nuclear program, and we had to actually go outside the agency and bring in Steve White, and you know about all of that.

But what I am leading up to is we do not have any managers in high places in our nuclear program today that were in high places back in the mideighties. It has been a complete changeover. We are still short several dozen really key people, and we are trying to recruit those right now. And I think the Board will continue to do that, and we would solicit your advice, but it is a tough job, and the less interference in general out of Washington, probably the more likely they are to continue to succeed.

I think that I am kind of disappointed that the country has not really faced up to the problem of an energy policy. When I came to TVA from KUB in 1981, this country was importing one-fourth of its oil, and now we are importing one-half of it. I have always felt like the electricity was the way to go, to electrify railroads and do some things that we can do to reduce the consumption of petroleum products.

But so far the economics have not pushed anybody in that direction and, as you pointed out, as capacity runs short in the electric industry, somebody has got to do something to build that up in order to take care of such things as electrifying the railroads, which will have to be done sooner or later.

TVA is really doing a pretty good job and is really in pretty good shape for the future, I am happy to say, because we have got, for one thing, a great system of 500-kV transmission lines that we can move power from one part of the system to the other and buy it from one neighbor and sell it to another and do all kinds of things like that.

We also have got some really good coal-fired plants. At one time we thought a lot of those would be abandoned as the nukes came on, but that it just is not the way it came out.

To give you an idea of what is being done to get ready for the future, we are about finished with a $70 million project—and it will be finished this year—to put in new electrostatic precipitators and to burn lower sulfur coal. That is one of those things we have done to improve the quality of the air and the quality of the effluent of that plant. And so we are, in many ways, ahead of some of these laws that might be passed. Already down there there is a huge pile of low-sulfur coal being accumulated to operate when these new precipitators come on later on this year. So, we are not sleeping. We are rebuilding these plants.

One of the great generators in that plant was out on the floor in pieces and is being completely rebuilt. These plants will go on. They were supposed to be used for 30 years, and now they are going to be used for who knows, 40, and maybe 50 years because that is the way it is going to have to be all over this country.

I think we will continue to see competitive rates. I think the TVA will be on the leading edge of a lot of the research, but we cannot, of course, do it all. But I am certainly happy to have been a part of it, and I think that left to our own devices, we will do a real good job taking care of the people's needs.

And let me say this about conservation. Everybody believes in it, but that program for residential customers was in place for 10 years, and it had no effect on new houses. People had 10 years to retrofit their houses.

I built a house during that period and I could get nothing from TVA. I did not want anything. But the point I am trying to make is it was up to me as a builder of a new house to insulate that house properly, and by that time electricity was up to 4 and 5 cents a kilowatt-hour, and it was the only sensible thing to do, to get double-paned windows and lots of insulation.

I guess the point I am trying to make is that people have had 10 years to retrofit houses. There has been no program for new houses anyway except as to putting in heat pumps, and so it is not as bad as some might have you believe. We still have advisers for our commercial and industrial installation and we go out and try to help them save energy on their processes and that type of thing so they can be more efficient and be better citizens of the valley.

So, I am sure that Chairman Runyon will heed what you said, we will take a look at what is there. But I want you to know that we have done a pretty good job down there, and people have had a good chance to get their houses retrofitted.

Senator Sasser. Well, thank you, and we will take heed of your admonition that there not be too much interference from Washington.

I will tell the fellows over in the House of Representatives who have been interfering that they ought to do less of that. [Laughter.]

I agree with you 100 percent on the basis that we need an energy program again, an energy policy here in this country. We had one, and we abandoned it in 1980 or 1981, and you are quite correct. We have seen our importation of imported oil increase now. Once again, it was about 50 percent of the oil consumption.

We are setting ourselves up for a gigantic fall once more and setting ourselves up for another terrific oil shock to our economy, and we just now adjust in the mid-eighties did we get over the oil shocks completely of the decade of the 1970's, those two terrific oil shocks, and I think we are setting ourselves up for another one.

CONDITION OF TVA LAKES

Mr. Waters, you and I share a joint interest in the Tennessee River and its tributaries. The lakes are getting older. The Tennessee Valley system is unique in that it is the longest system, water system, and there are more dams on it than any place in the world, if memory serves me correctly, and now these reservoirs are starting to age, and the world really has not had any experience with reservoirs of this magnitude or waterway dammed the way the Tennessee River and its tributaries have been dammed.

The world really has not had any experience with these reservoirs maturing and what we can expect. I would be interested in your views on the overall condition of the reservoir and the river system from a water quality standpoint.

And you mentioned something earlier in your statement about trying to do something about the low-dissolved oxygen levels. Now, of course, we have seen the results of that in these massive fish kills down around Kentucky Lake. Give us your view of the overall condition of the reservoir and tell us how you are going to go about putting some more oxygen back in the water.

Mr. WATERS. Mr. Chairman, you, along with us and several other people, got concerned about the reservoirs back when we had this terrible 5-year drought that just ended a year ago. It was a bad situation and had a bad effect on plant life. It gave us a lot of problems because we just did not have enough water in the system in many instances to assimilate the waste that was going in, and that is where dissolved oxygen, of course, becomes such a key problem. If you have got good oxygen levels, you can assimilate more waste, the fish life is healthier, and you just have a better lake.

But we had this terrible drought that you remember, and you were concerned about problems in Kentucky Lake. Our fish biologists were there on the scene and I think did an excellent job, and we learned a lot there.

One of the things we learned is by just keeping a minimum flow of waters through the reservoirs we can have a pretty dramatic effect on water quality. Of course, we knew that, but we did not know exactly how it worked. We had the drought to contend with, and we learned a lot about that. That is one of the things we want to do with this lake improvement study—we hope we can do—is to keep more of a minimum flow, keep water moving more in the entire reservoir system.

The TVA system is a remarkable system. The dams were well built. They were built by brilliant engineers, dedicated people that did a fantastic job. They are still good. A number of the problems that they are worried about back then simply really have not happened.

We have got a new set of problems, and water quality just has to be one of them. There is no question that when you build a dam backing up the water you do impact dissolved oxygen in that water, and we are having to address that. And I can tell you, Mr. Chairman, which I know that you know because you have the reports, but the fish life in Kentucky Lake is OK. We have ascertained that and we are satisfied with it.

There were a lot of problems. There were a lot of blemished fish and a lot of fish that they took out of the lake and examined that had problems. But in nearly every instance we were able to determine that the problems were caused by the low flow, just too little water moving through the system. And, thank God, the rains came and we have a healthy system there now that we feel fairly comfortable with, but we are continuing to monitor it.

Senator SASSER. Thank you, Mr. Waters.

Well, Mr. Chairman, I want to thank you and your colleagues for appearing here before us and, again, I would express my word of commendation for the splendid work you have been doing in keeping the rates down in the Tennessee Valley region and also for making the Tennessee Valley Authority a more lean and cost-efficient organization. You and your colleagues, I think, have done an excellent job in that regard. And, again, our thanks for it.

I would ask you to put an environmental badge on your hat in addition to the low rate badge and the cost-efficient badge and bring TVA back into the forefront once again of being an environmental pioneer in the Tennessee Valley region.

ADDITIONAL COMMITTEE QUESTIONS

We will submit the balance of the questions for response in the record.

[The following questions were not asked at the hearing, but were submitted to the Authority for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR SASSER

TVA EXPENDITURES

Question: During the past two years, how much has TVA spent on advertising? Please provide a breakdown on how much was spent on television, radio, newspapers, magazines, etc.

Answer: Excluding classified advertisements for job recruitment and surplus property sales, TVA's advertising expenditures for FY 88 were as follows:

- $50,000 - TVA reimbursed the Tennessee Valley Public Power Association for research and development costs on the marketing campaign, "Electricity, The Power of Choice."
- $700,000 - Advertisements in Tennessee Illustrated magazine (one year contract--not renewed).
- $3,000 - Advertisement in the Knoxville Chamber of Commerce Business Directory.

Total FY 88 advertising expenditures excluding classified ads - $753,000.

Excluding classified advertisements for job recruitment and surplus property sales, TVA's advertising expenditures for FY 89 were as follows:

- $2,000 - Radio announcements for nuclear emergency preparedness.
- $50,000 - Newspaper advertisements for vacant office space in Knoxville and Chattanooga.
- $9,000 - Newspaper advertisements congratulating power distributors on 50th anniversaries.
- $15,000 - Advertisements in Chambers of Commerce Business Directories.
- $36,000 - TVA reimbursed power distributors in northeast Mississippi and western Tennessee for media costs for "The Power of Choice" marketing campaign.
- $44,000 - Newspaper advertisements thanking TVA employees for the second year of TVA's rate freeze.

Total FY 89 advertising expenditures excluding classified ads - $156,000.

Question: What are TVA's plans for future expenditures on advertising? How much money will be spent and in what media will the advertising appear?

Answer: During FY 90 we are continuing to advertise our vacant office space in newspapers and magazines and plan to place ads in the 1991 Chamber Business Directories. We also plan to celebrate the third year of no rate increase if our financial situation permits. Most of our advertising will be in Valley newspapers. Expenditures in FY 90 should approximate FY 89 cost.

Our advertising strategy and budget is currently being developed for FY 91.

REFUSE DERIVED FUEL

Question: Is TVA proposing regional processing of municipal solid waste, or only the regional consumption of refuse-derived fuel?

Answer: With respect to the RDF project, TVA is investigating both options mentioned in your question. We do not envision TVA building and operating the regional processing facility, only the RDF combustor. However, TVA would provide technical assistance in establishing the processing facility if local governments are interested in that approach.

Finding regional solutions to waste management problems is a thread that runs throughout TVA's approach to this issue. Because the predominant focus of our program is on rural areas, we believe that lasting solutions to waste problems in those areas cannot be developed unless small rural communities and counties band together and pool their resources to solve those problems. The problem is just too large for one entity to solve alone.

Question: In the materials TVA has distributed regarding tentative plans for an RDF facility, it has made reference to a 1000 ton per day plant as a pilot. As of today, far less than 100 tons per day are being produced in the entire state of Tennessee. Why is TVA proposing a 1000 ton per day pilot plant? Where does TVA expect to get this much RDF in the short term? What is the freight cost per ton of hauling RDF over 50 miles, and what would be the economic impact of this cost on the producer of RDF? If the purpose of a pilot plant is to demonstrate feasibility, wouldn't it make more sense to build a 100-200 ton per day pilot plant instead of spending $84 million on a 1000 ton per day plant?

Answer: First, TVA has not yet decided on a final size for the facility. At this stage of study we are evaluating plant sizes ranging from 250 to 1200 tons per day of RDF capacity. The final size will depend on several factors, including local interest and the availability of fuel supply as determined by TVA's feasibility study.

Second, we realize that current production of RDF is less than 100 tons per day, but we anticipate that during the 52 months required to build the RDF combustor that supply will increase if the cost is competitive with other disposal alternatives. TVA also intends to work actively with communities interested in participating in the RDF project to develop the required processing capacity.

Third, transportation issues have not been addressed at this point, however, we realize that it is a major consideration in determining appropriate combustor size.

Lastly, the purpose of the RDF project is not to demonstrate the technical feasibility of an RDF combustor. This has already been demonstrated at several locations. TVA's purpose is to demonstrate the commercial feasibility of utilizing RDF as part of an integrated solid waste management system and supplemented energy source for the Tennessee Valley.

Question: Is TVA pursuing the option of co-firing RDF in existing boilers?

Answer: We have ruled out this option because of the problems this approach poses for efficiency and maintenance of our boilers. We just feel that this option is not in the best interests of our customers. Our existing boilers were designed for the most efficient production of steam for electric generating purposes--not for burning wastes. While it is true that other utilities have experimented with cofiring RDF and coal, our information indicates that the majority of those efforts have been abandoned because it was found that pulverized coal boilers are incapable of handling even low levels of RDF without tube fouling, pluggage, and a host of other technical problems. In short, cofiring would ultimately cost more not less than having a parallel RDF boiler.

We want to help solve the region's waste problems, but not at the expense of producing competitively priced, reliable electrical power. We believe a boiler solely dedicated to burning RDF can provide a viable waste disposal alternative while, at the same time, supplementing our steam/electricity supply in a way that does not increase maintenance problems and reduce the efficiency of our steam plant.

Question: What is TVA's position on the environmental, economic, and political advantages of burning RDF?

Answer: We believe there are environmental advantages to an integrated approach to municipal solid waste management. The integrated approach includes maximizing waste reduction, implementing material recovery (recycling) and energy recovery (RDF combustion), and minimizing the amount of waste that must be landfilled. Energy recovery does produce environmental emissions, but these emissions can be controlled with available technology.

The economic advantages are not as readily apparent. In fact, in the short term it may cost more to process waste and burn RDF than either landfilling or mass burning waste. The economics must be calculated on a life cycle basis to show a financial incentive. Over time, the cost of landfilling will increase due to higher operating costs and increased regulations. Also, the cost of conventional fuel is expected to increase with time. Still, the value of an RDF project is greater as a waste volume reduction strategy than as a means of saving costs on conventional fuel.

With respect to your point about political advantages, TVA recognizes the regional and national benefits that would result from developing an environmentally and economically sound method of utilizing municipal solid waste through material and energy recovery. Industries will prefer to locate in areas where a sound waste management policy is being implemented, whether that's in the Valley region or elsewhere.

Question: In some information that has been disseminated by TVA, it has been suggested that TVA will charge a price for a ton of processed RDF delivered to TVA by the local governments or counties. Given that it is going to cost millions of dollars for these local governments to put in the processing equipment necessary to process solid waste to produce RDF, is it realistic to assume that after having spent millions to produce RDF the local governments are then going to be able to pay TVA for taking the RDF?

Answer: To date the economics of waste-to-energy projects are such that RDF as a utility fuel has a negative value. Thus, TVA believes that RDF utilization should be viewed primarily as a waste disposal option with electricity as a byproduct that can offset part of the waste disposal cost. While TVA will give credit for the energy value of firing RDF, this value is not sufficient to offset depreciation, operation, and maintenance expenses. In short, the system would operate at a deficit unless it is paid for by users in the form of a tipping fee or by federal and/or state appropriations. TVA cannot make up any short fall in revenue by passing costs along to TVA power customers. The amount of tipping fee required to make the project economically viable will be determined as part of the prefeasibility study which is to be completed July 1990.

Question: In the future, there may emerge a market for RDF since RDF is a fuel. If TVA does not pay something approximating the Energy value of the RDF to the suppliers of RDF, is it realistic to assume that the local governments will agree to long-term supply agreements or that TVA will have an adequate supply of RDF?

Answer: Under the TVA RDF concept credit will be given for the energy value of RDF, but the credit is offset by the additional cost of burning RDF compared to coal. It costs about $4-5,000/kW of capacity to build an RDF combustor versus about $1,200/kW for coal-fired capacity. In order for TVA to invest in an RDF combustor it must be assured sufficient quantity of fuel is available and producers are willing to guarantee supply through a long-term agreement. Unless such a commitment is made there would be no assurance of TVA recovering its incremental investment. RDF combustion is not a panacea, therefore, local officials will need to evaluate their waste management options before deciding on any waste disposal method. If RDF combustion makes economic sense then would be the time to enter into an agreement with a vendor, such as TVA, on a long-term basis.

CUMBERLAND RIVER STUDY

Question: Mr. Chairman, it is my understanding that the U.S. Army Audit Agency has recently completed a study which recommends that the nine hydroelectric facilities in the Cumberland River Basin be sold to a private power producer or transferred to TVA.

Mr. Chairman, as you know the Corps of Engineers operates and maintains nine hydroelectric facilities in the Cumberland River Basin. Power generated by these facilities is marketed, through the Southeastern Power Administration of the Department of Energy, which establishes the rates to be charged.

Can you tell me whether TVA has been contacted about such a move and whether you would support a recommendation?

Answer: In early 1989, the Army Audit Agency (AAA) met with members of TVA's Power Supply Division to discuss TVA's operating relationship with the Nashville District Office of the Corps of Engineers and the Southeastern Power Administration (SEPA). AAA was conducting a routine audit of the operation of the Nashville District of the Corps.

It is TVA's understanding that AAA was investigating whether it might be more efficient for TVA to manage the entire water resource in the TVA region, rather than having two federal agencies manage two reservoir systems which are essentially integrated by the TVA power system as well as the Kentucky-Barkley Canal. TVA representatives simply provided information on TVA hydro operations and TVA's contractual relationships with the Corps and SEPA.

AAA was informed that the Corps owns, operates, and maintains nine projects on the Cumberland River System. TVA owns, operates, and maintains one single-purpose power project, Great Falls Hydro Plant, on the Cumberland River System. Although the Corps has overall water management responsibility, including flood control and navigation on the Cumberland River, TVA schedules and dispatches the generation from eight of their plants as part of the integrated operation of the TVA hydrothermal power system. The remaining Corps project, Laurel Hydro Plant, is scheduled and dispatched by East Kentucky Electric Power Cooperative. Although TVA schedules and dispatches the power from the Corps projects, the power is marketed and sold by SEPA. TVA delivers a scheduled portion of the power generated at the Corps plants to other utilities designated by SEPA, and retains the remaining power for customers inside the TVA service area. TVA pays SEPA for the retained power, and receives credit on its bill for wheeling services provided by TVA.

The AAA also contacted TVA's Power Production organization regarding manpower and staffing arrangements at TVA hydro plants. This information was to be used to compare with staffing arrangements at similar plants operated by the Corps. They were supplied information on three TVA plants, Cherokee, Pickwick, and Boone, for comparison with the Corps plants, Center Hill, Wolf Creek, and Dale Hollow. The information supplied included numbers of administrative, operating, and maintenance staffs, technicians, and security.

At this time, we do not know the outcome of the AAA investigation.

PICKWICK RESERVOIR PLAN

Question: The Pickwick Reservoir Plan was prepared in 1981 by Tennessee Valley Authority's Office of Natural Resources in cooperation with the Offices of Agriculture and Chemical Development, Economic and Community Development, and Power.

Has the plan been updated, reviewed, or revised since 1981? Is any update, review, or revision of the plan in progress? Is any update, review, or revision of the plan under consideration?

In responding to these questions, please discuss and describe in detail any land use approvals, TVA program activities, major changes in management policies, significant changes in surrounding land use patterns, or other events which have occurred since the plan was prepared in 1981 and which might occasion updating, review, or revision of the plan. Please address in particular the new National Aeronautics and Space Administration (NASA) facility and the impact which it will have upon the Pickwick Reservoir and surrounding areas.

Answer: The plan for Pickwick Reservoir has not been updated since its issuance by the TVA Board of Directors in 1981. Revisions to some of the specific allocations in the plan have subsequently been recommended to and approved by the Board. The nominal planning cycle for TVA reservoir land management plans is ten years. To aid in deciding the extent to which a plan should be updated or revised after about that amount of time, TVA monitors regional and local trends, issues, and changes. The Pickwick plan is scheduled to be reviewed for possible updating in 1993 (budget permitting). This would include a review of land uses, resource conditions, and public concerns on the entire reservoir. During an update review, input is gathered from the public and local, state, and Federal agencies to identify issues, concerns, needed revisions to the reservoir plan, and policy recommendations.

TVA reservoir land management plans address land acquired with appropriated funds by the agency around its reservoirs. These plans do not address property managed by TVA for the production of power (power property) nor do they include privately owned shoreland. At the time the Pickwick Reservoir Land Management Plan was being prepared, TVA was developing the Yellow Creek Nuclear Plant on the site now occupied by NASA. Because the site was power property, it was not part of the land covered by plan. Accordingly, it was not necessary to revise the plan to reflect a change in the intended use of that site. In addition, TVA concluded that the scope of the NASA project was encompassed by the scope of the nuclear plant project.

TVA is now working on the completion of a land management plan for Wheeler Reservoir. Following that, the plan for Tellico Reservoir will be updated and revised as required under a contract between the Tellico Reservoir Development Agency and

TVA. Based on recent reservoir planning funding and staffing levels, we realistically envision that an update to the Pickwick plan can be done in 1993.

Since the Pickwick plan was prepared in 1981, three major developments on Pickwick have influenced or are influencing growth patterns. These are the Tennessee-Tombigbee Waterway, the Yellow Creek Port industrial area, and the proposed NASA facility at Yellow Creek. Of these, only the latter was not anticipated when the plan was prepared. The proposed facility has moderately impacted the Pickwick Reservoir area through increased demand for residential property (both lakefront and offshore). We are not aware of any significant increased commercial or industrial growth resulting from the NASA project since its announcement. Although the Yellow Creek Port has not experienced major growth, recent development proposals (wood chip mill, wood storage yard, etc.) may result in more growth. Increased use of the Tennessee-Tombigbee Waterway appears to be spurring most of these forest product industry proposals.

As stated in the final NASA Environmental Impact Statement (EIS) for the space shuttle Advanced Solid Rocket Motor (ASRM) program, land use impacts resulting from the ASRM project at Yellow Creek are expected to be minor. Recreational use of Pickwick Reservoir and adjoining lands will be slightly affected by the project. Indirect land use impacts include potential land speculation and potentially rapid subdivision growth. However, using the U.S. Army Corps of Engineers (USACE) Economic Impact Forecast System threshold of 3 percent or more change in population to identify changes that might be considered significant, the population impacts of this project would be insignificant in all counties except Tishimingo, where the effect would be moderately significant. Considering that Tishimingo County has had a 2 percent decrease in population since 1980, this growth would be expected to just slightly more than reverse that trend. There are currently 7,500 vacant private housing units in the area and housing prices have decreased 25-30 percent since termination of nuclear plant construction. The NASA project should bring about some revitalization in the depressed housing market.

LAND-USE PLANNING

Question: Is there a need for the development of inter-agency plans with the Army Corps of Engineers or other agencies to prepare coordinated land use and permitting goals for the long term use of reservoir resources and surrounding land?

Answer: TVA recognizes the need for extensive coordination and cooperation during development of its land management plans, not only with other Federal agencies but with all levels of government concerned with the management and use of reservoir resources. During its reservoir lands planning process, TVA conducts extensive public participation and coordination meetings to develop goals for the management of TVA land. When the Pickwick plan was being prepared, nine public meetings and Board listening sessions were held in the Pickwick area. Additionally, numerous coordination meetings were held with local, state, and Federal officials and agencies. These meetings were used to develop information regarding the needs, issues, and values of the public and to identify local development pressures. As part of the planning process, TVA also prepares an extensive computer data base with information on TVA land use capability, environmental resources, and cultural features. TVA believes that these ongoing planning efforts provide adequate opportunity for public input and coordination with other agencies.

On Pickwick and all other TVA reservoirs, TVA has the authority and responsibility for planning, development, management, and use of all Federal land in its custody and for all permitting functions under Section 26a of the TVA Act. USACE has authority on TVA reservoirs for maintenance of the commercial navigation channel, operation of navigation locks, and all permitting functions under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

TVA and USACE have executed a Memorandum of Understanding that emphasizes the need for cooperation in exercising the two agencies' respective permitting authorities. TVA works closely with USACE in the review of permit applications by issuing joint public notices, cosponsoring public hearings, and collaborating in the preparation of environmental reviews under the National Environmental Policy Act (NEPA). When TVA review reveals that other agencies such as state wildlife management agencies, the U.S. Coast Guard, the U.S. Fish and Wildlife Service, or the U.S. Environmental Protection Agency have an interest in a particular proposal or action, TVA coordinates with and solicits input from those agencies.

Neither TVA nor USACE is responsible for or has authority over the development of land use or resource management plans for private property surrounding TVA reservoirs. This responsibility, when exercised, rests with state and local governments. Of the 500 miles of shoreline on Pickwick Reservoir, 132 miles (26 percent) is in private ownership. To our knowledge, local zoning, growth planning, and land use regulation is nonexistent in the Pickwick area with the exception of the quad cities area (Florence, Muscle Shoals, Sheffield, and Tuscumbia).

PICKWICK DEVELOPMENT CONCERNS

Question: We have received expressions of concern from constituents regarding the increasing pressure which is being placed upon Pickwick Lake by the development which has occurred and is occurring in that area and that which is anticipated to occur in connection with the NASA facility and other developments. The TVA has the power to affect the pace and nature of development in the area through the exercise of its permitting authority and otherwise.

(a) Has the TVA considered preparing, and will it consider preparing, an environmental impact statement or state- ments analyzing in detail the environmental consequences of the exercise of its permitting authority and other powers and the impact of its decisions upon the environ- ment in the Pickwick area?

(b) Has the TVA considered, or is it considering, any other procedures to ensure that the TVA and other governmental agencies deal with these problems in a coordinated and effective way, rather than on a piecemeal basis?

(c) Does the TVA have any suggestions or recommendations regarding legislation which might be considered by the Congress to enable the TVA and other agencies to deal with problems of the sort described above more effectively?

Answer: TVA is also concerned about increasing growth and development pressures placed on Pickwick Reservoir as well as other TVA reservoirs. As the population and economy have grown so have pressures for use and development of the shorelands. Pressures include the expanding need for public recreation facilities, commercial tourism development, residential development on private shorelands, and industrial development on the commercial navigation channel, including the Tennessee-Tombigbee Waterway. The fact that Pickwick Reservoir, specifically the Yellow Creek embayment, is the confluence of the Tennessee-Tombigbee Waterway and the Tennessee River navigation channel further adds to the area's desirability for waterfront industry and waterborne commerce. Both the waterway and the Yellow Creek Nuclear Plant project (now the site of the NASA project) were well under way in 1981 when the plan for Pickwick was issued. Transfer of the Yellow Creek site to NASA has been a positive factor in the economic revitalization of the area.

TVA's power to control the pace and nature of development is limited primarily to the property held by the agency. Under Section 26a of the TVA Act, TVA authority is largely confined to obstructions along or in the Tennessee River system which affect navigation, flood control, or public lands. Controlling the development of private lands is the responsibility of local governments.

(a) Under TVA procedures for implementing NEPA, TVA reviews the potential impacts of all actions it proposes to undertake or permit, including actions proposed on Pickwick Reservoir. This will continue in the future. Whether a specific action requires an EIS depends on the nature of the action.

(b) Yes, under the process for review of draft reservoir land management plans, all local, state and Federal agencies are provided the opportunity to review and comment on the land use and land management proposals. TVA also submits reservoir plans for review and coordination under the Intergovernmental Review process of Executive Order No. 12372. Additionally, TVA has proposed, in its draft EIS for the Tennessee River and Reservoir System Operation and Planning Review, the establishment of a Tennessee Valley Land and Water Forum. If adopted and implemented, the governors of the seven Valley states as well as appropriate Federal agency heads would participate
in efforts to promote consensus and agreement on land and water resource priorities and program directions that affect the reservoir system. This group would promote achievement of mutual objectives through specific action plan implementation.

(c) We believe concerns about the scope and pace of development of TVA-owned land are adequately identified and addressed through our reservoir land management planning process. A void exists with respect to privately owned reservoir land. We continue to offer technical advice and assistance to state and local governments concerning specific resource issues. However, we believe this void can best be filled through state-imposed requirements for land use/development regulations and zoning at the county level. Implementation of local controls would be far more effective than Federal legislation. The concerns about development impacts might also be alleviated to some extent by providing agencies greater authority to protect sensitive resources such as floodplains and wetlands.

SUBCOMMITTEE RECESS

Senator SASSER. Gentlemen, thank you very much for appearing here this morning, and this subcommittee will stand in recess.

[Whereupon, at 11:25 a.m., Friday, April 20, the subcommittee was recessed, to reconvene subject to the call of the Chair.]

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 1991

THURSDAY, MAY 3, 1990

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:05 p.m., in room SD-192, Dirksen Senate Office Building, Hon. J. Bennett Johnston (chairman) presiding.

Present: Senators Johnston, DeConcini, Hatfield, McClure, Domenici, and Specter.

DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS—CIVIL

STATEMENT OF HON. ROBERT W. PAGE, ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

ACCOMPANIED BY:

LT. GEN. HENRY J. HATCH, CHIEF, CORPS OF ENGINEERS

MAJ. GEN. PATRICK J. KELLY, DIRECTOR OF CIVIL WORKS

DONALD B. CLUFF, CHIEF, CIVIL WORKS PROGRAMS DIVISION

OPENING REMARKS

Senator **JOHNSTON**. This afternoon we will receive testimony on the fiscal year 1991 budget for the civil works program of the Army Corps of Engineers. We will hear from the Assistant Secretary of the Army for Civil Works, Mr. Robert Page, assisted by the Chief of Engineers, Lt. Gen. Henry J. Hatch, the Director of Civil Works, Maj. Gen. Patrick J. Kelly, and Mr. Donald B. Cluff, the Chief of the Civil Works Programs Division.

Gentlemen, we welcome all of you. We are pleased to have you with us. So, if you have formal written statements, those will, of course, be submitted for the record and you may proceed to summarize those statements.

Mr. Page, you may proceed.

SUMMARY OF BUDGET REQUEST

Mr. **PAGE**. Thank you, Mr. Chairman. You have introduced our principals here, so, I will dispense with that, along with requesting that our formal statements be submitted for the record.

The President's 1991 civil works budget, as recently amended, totals $3.50 billion, representing a 6-percent increase over the post-sequestration level of 1990.

The work funded for initiation in fiscal year 1990 places substantial demands on fiscal year 1991 resources. It includes more than 30 new construction starts, 63 new reconnaissance studies, and 41 preconstruction engineering and design projects.

Since November 1986, local cooperation agreements have been signed with sponsors for 115 projects, representing a total investment of over $4.5 billion.

We are all familiar with the Alaskan oil spill, Hurricane Hugo, the California earthquake, and recent floods in various parts of the country. The Corps' response to these disasters was commendable.

The budget for the proposed construction program for 1991 is $1.43 billion including $224 million for the MR&T project. The budget for the operation and maintenance program is just under $1.4 billion. For maintenance of the MR&T project, it is $120 million.

We are placing emphasis on wetlands protection. The budget request for our regulatory program is $75 million.

The 1991 budget is based on several proposed user fee changes. Those requiring authorization include an increase in harbor maintenance user fees and expansion of recreation user fees. I am sure you will want to cover that.

Mr. Chairman, we have had a hiring freeze since January, as you know, which was about to impact our civil program severely. To prevent this, we prepared a reclama for our civil program. This has gone through a rather tortuous review process, having cleared all of the bureaucratic hurdles, and is now sitting on Dick Cheney's desk. We should have it signed very shortly. I am pleased to make that statement, because much of our work on the Mississippi and in other endeavors, as you know, is done by temporary workers.

Senator JOHNSTON. What will the impact be of the hiring freeze?

Mr. PAGE. If Mr. Cheney signs the reclama, the hiring freeze will be lifted for the civil program. The Defense Department put the freeze on all operations. We stated that it should not apply to our civil works program. It has taken us, now, I would say, better than 4 months to make the point that the civil works program does not, in fact, impact upon the defense budget.

Senator JOHNSTON. That will be very good news up and down the Mississippi River.

Mr. PAGE. Yes, sir; it will be.

PREPARED STATEMENT

That concludes my summary, Mr. Chairman. It is a pleasure to be here today.

[The statement follows:]

STATEMENT OF ROBERT W. PAGE

INTRODUCTION

Mr. Chairman and members of the subcommittee, I am pleased to be testifying before this Subcommittee today on the proposed fiscal year (FY) 1991 budget for the Civil Works program of the Army Corps of Engineers. Assisting me are the Chief of

Engineers, Lieutenant General Henry J. Hatch; the Director of Civil Works, Major General Patrick J. Kelly; and the Chief of the Civil Works Programs Division, Mr. Don B. Cluff.

My statement covers the following topics:

Overview of the President's fiscal year 1991 Civil Works budget; items of Special Interest, fiscal year 1989 and fiscal year 1990; and specifics of the fiscal year 1991 Civil Works budget, including: construction program, operation and maintenance program, regulatory program, changing priorities of the civil works budget, extensions of the beneficiary pay principle, and support for others.

The Chief of Engineers also has a statement which provides additional details on the President's budget for the Civil Works program.

OVERVIEW OF THE PRESIDENT'S FISCAL YEAR 1991 CIVIL WORKS BUDGET

The proposed fiscal year 1991 budget for the Civil Works program, as recently amended, totals $3.50 billion, a 6 percent increase over the post-sequester level for fiscal year 1990. This is a sound and responsible budget. The budget reflects the Administration's continued support for development of the Nation's water resources for commercial navigation and flood control and for efficient management of Corps of Engineers operated and maintained navigation systems and reservoirs.

The budget places new emphasis on maintaining and restoring the environment. A number of important and high priority initiatives that demonstrate our commitment to the environment are budgeted which will mitigate environmental losses at previously constructed projects: $16 million is proposed for juvenile fish mitigation on the Columbia and Lower Snake Rivers; $20 million is proposed to initiate acquisition of 88,000 acres of land to mitigate the adverse environmental effects caused by construction of the Tennessee-Tombigbee Waterway; and funds are proposed for mitigation of completed segments of the Yazoo Backwater project and preconstruction engineering and design (PED) for mitigation of the impact of the Richard B. Russell Dam and Lake project and the Missouri River navigation project.

The budget also proposes innovative approaches to improving the Nation's infrastructure, including the Magnetic Levitation Transportation Pilot program.

The proposed fiscal year 1991 budget of $3.50 billion includes $3.29 billion in Federal funds and $207 million in non-Federal contributions. These non-Federal cash contributions are supplemented by the provision of lands, easements, rights-of-way and relocations for authorized projects, which are estimated to cost $243 million.

The Federal budgeted amount includes $2.67 billion in General Treasury appropriations and $618 million from the Inland Waterways and Harbor Maintenance Trust funds ($133 million from Inland Waterways Trust Fund and $486 million from the Harbor Maintenance Trust Fund, which includes $193 million under existing legislation and $293 million under proposed legislation). Harbor maintenance user fees would be increased to a level that would be sufficient to cover all commercial harbor maintenance costs.

The General Treasury appropriations will be offset by some $33 million in receipts from currently authorized recreation use fees, payments for lease of Federal lands, and tolls collected by the St. Lawrence Seaway Corporation. Under proposed legislation, the General Treasury amount would be further offset by $20 million for special recreation use fees. By administrative action, some $17 million in governmental fees will be collected for processing permit applications and other requests under the Regulatory program.

Table A, which is attached, summarizes the amended fiscal year 1991 budget by appropriation account.

The fiscal year 1991 Civil Works budget is reflective, to a considerable extent, upon directions established, and challenges confronted, in prior years. Accordingly, it is appropriate to mention a number of items of special interest in fiscal year 1989 and fiscal year 1990 Civil Works programs before presenting specifics of the fiscal year 1991 Civil Works budget.

ITEMS OF SPECIAL INTEREST, FISCAL YEAR 1989 AND FISCAL YEAR 1990

NEW STARTS AND OTHER NEW WORK

Mr. Chairman, the large number of projects and studies funded for initiation in fiscal year 1990 present a challenging new starts and new work program. It is a program that places substantial demands on fiscal year 1991 resources. The total Federal commitment reflected in the work added to the fiscal year 1990 program exceeds $1 billion. In addition to funding 10 new construction projects requested in the President's budget, final action on fiscal year 1990 appropriations provided for the initiation of construction on more than 20 other projects, as well as for a substantial level of other new work, such as the reconstruction of the Sacramento River levees in California. Appropriations for fiscal year 1990 also funded the initiation of 63 new reconnaissance studies, twice the number requested, and 41 preconstruction engineering and design (PED) projects, 9 more than requested.

CONTROLLING COSTS AND MAINTAINING SCHEDULES

The cost estimates and schedules presented in the fiscal year 1991 budget justifications have been adjusted since presentation of the fiscal year 1990 budget. This includes adjustments to authorized project costs enacted by Congress in the 1990 Energy and Water Development Appropriations Act and in the Dire Emergency Supplemental Appropriations Act of 1989. Approximately half of the projects budgeted for construction last year and funded under the new cost sharing rules now have cost estimates higher than a year ago and a comparable number of schedules for these projects also have slipped. Most of these projects were formulated without the discipline of having a cost sharing partnership and well before our management changes were put in place. Nevertheless, we are not satisfied with this performance and are resolved to improve it.

This resolve is reflected in the significant changes in management procedures—identified as Initiative 1988—that have been put in place. Sufficient time has elapsed to permit us to not only identify projects having cost and schedule changes, but to apply improved estimating discipline to projects under the new system and to redirect existing personnel to positions which can most effectively support our commitment to the construction of sound projects on time and within budget. Project managers have been assigned to all major Civil Works projects. These managers are responsible for maintaining costs and schedules from the study phase through construction, and serve as the primary point of contact for the cost sharing partner. In addition, monthly meetings of top management are held at the Districts, Divisions, and Washington Headquarters to identify issues and get them resolved quickly. In each District, a permanent Deputy District Engineer for Project Management has been installed. In addition, Divisions have been authorized to reorganize to strengthen their performance and in the Headquarters, key management positions in the Project Management Division have been filled.

We also are eliminating time consuming, sequential reviews wherever possible, so that the project manager can proceed, knowing that the district, division, Headquarters, and the Office of the Assistant Secretary share a common perspective. We have put emphasis on measuring and controlling overhead and on the importance of a thorough cost estimate early in the planning process, so that the estimates we present more accurately reflect the complete cost of the project. Finally, project managers will have sufficient authority to justify their accountability for results.

LOCAL COOPERATION AGREEMENTS

We are pleased with the progress made in fiscal year 1989 in executing Local Cooperation Agreements (LCAs) for construction new starts. Since cost sharing reforms went into effect in November 1986, LCAs have been signed with sponsors of 115 specifically authorized projects. Of these LCAs, 32 were executed during fiscal year 1989 and 13 have been executed so far this year. The total investment represented by these 115 LCAs is in excess of $4.5 billion, of which more than 35 percent is to be provided by non-Federal sponsors. Additional LCAs are scheduled to be signed during FY 1990 with sponsors of 23 major projects.

CONTINUING DROUGHT EFFORTS

Drought conditions continue to affect Corps projects in some areas of the Nation. Projects are plagued by low reservoir storage volumes and low river levels which, in turn, cause negative impacts on all the purposes for which the projects were authorized. A short assessment of the most significantly affected areas follows. Responding to these events will require careful management of financial and personnel resources.

Missouri River Basin.—After 3 successive drought years, the six main stem Missouri River reservoirs, which comprise the Corps largest single water storage system, are at their lowest volume since the system was first filled in 1967. Diminished project releases have affected hydropower generation, navigation depths, water supplies for municipalities and power plants, and river-based recreation, and lower lake levels have affected lake-based recreation and some municipal and agricultural water supplies. Although the current volume of stored water should be sufficient to meet project purposes generally even if the drought were to continue for several more years, it still would take 6 successive years of normal runoff to refill the reservoirs to their normal operating levels.

Middle Mississippi River.—Below-normal runoff from the Upper Mississippi River and the Missouri River basins caused the flow rates and stages of the Mississippi River between St. Louis, Missouri, and Cairo, Illinois, to be well below normal throughout 1989. At times, these conditions required reduction in the size and draft of the commercial barge tows navigating this reach of the Mississippi River and, during the ice-impacted period last December, caused the closure of navigation for several days. Conditions have improved somewhat since the beginning of the year. Increased precipitation and runoff have resulted in higher river stages along the middle Mississippi River. The stage at St. Louis, Missouri, has been equal to or greater than the stage at the same time last year.

California's Central Valley.—The third successive year of drought in central California caused low storage levels to be reached at 2 Corps reservoirs in the southern portion of the Central valley during 1989. Storage volumes now are at 18 percent and 44 percent of the respective historical average amounts at the 2 Corps projects. This shortage of storage principally affects the irrigation districts that bought the storage capacity and own the rights to the water therein. Similar situations are encountered at other Federal and State reservoirs in the region.

Central and Southern Florida.—Lake Okeechobee, the principal source of water for the Central and Southern Florida region, dropped in volume for the second year in a row and is now more than 2 feet below normal. Also, the water conservation areas are at their lowest levels ever. Water deliveries from the Corps Central and Southern Florida project through Shark Slough to the Everglades National Park have been stopped, and only minimum deliveries are being made to the park through Taylor Slough. Water restrictions have been imposed on residential and commercial users within the South Florida Water Management District, the local sponsor for this project.

Water Management During Drought Study.—We appreciate this Subcommittee's support for initiation in fiscal year 1990 of a wide-reaching study of water management during drought. The fiscal year 1991 budget includes $2.5 Million to continue this important effort. We recognize that the value of project outputs change over time and that project operations should change with those values. It is our expectation that this study will increase the contribution which existing projects make to the Nation's economy by developing a consensus on this and other issues regarding the management of the Nation's waters during drought.

CORPS RESPONSE TO DISASTERS

The past year saw a series of events that challenged the Corps' ability to respond to multiple disasters, both natural and man-made. The Corps met these challenges admirably, and we are proud of all of the personnel involved. We would like to summarize for the record our involvement in those major disasters.

When the Exxon Valdez grounded on March 24, 1989, it created a crisis that the oil industry and the Nation were not prepared to handle. In support of the Department of Defense, the Corps provided two seagoing hopper dredges, the Essayons and the Yaquina, which were successful in skimming 6,900 barrels of oil out of a total of 51,000 barrels recovered.

This spill response demonstrated the capabilities of Corps hopper dredges and potentially those of industry to respond to such events. In addition, scientific teams from two Corps R&D laboratories provided on-site technical support to the Alaska oil spill cleanup effort.

To improve its ability to respond to oil spills in the future, the Corps has initiated several actions. These actions include an engineering study to identify retrofits and modifications that can be made to Corps hopper dredges to enhance oil recovery operations in a safe manner; a survey of industry-owned hopper dredges and industry's capability to respond; use of latest techniques in remote sensing to locate and track oil; coordination with other agencies relative to shore cleanup; and management strategies to ensure a timely, efficient and cost effective response on the part of the Corps.

Hurricane Hugo struck in mid-September. Before Hugo made landfall, the Corps dispatched personnel to potential target areas, such as the Virgin Islands, Puerto Rico and the South Atlantic Coast of the mainland. The Corps worked with local and State authorities in reviewing an evacuation plan that enabled 130,000 people to safely leave the Charleston area. After Hugo struck on September 18, the Corps initiated immediate response activities. In the Carolinas, the Corps provided survey boats and standby equipment to ensure safe passage of vessels in Charleston Harbor. In the Virgin Islands, the Corps provided generators for hospitals and other life-support facilities, and Corps personnel assessed damage to the island's power system and harbor facilities at Fredericksted Pier. In Puerto Rico, the Corps provided tankers and potable water and removed sunken vessels endangering traffic in San Juan Harbor. There is an ongoing effort in the Virgin Islands, particularly in St. Croix, where the Corps is managing the restoration of the island's infrastructure.

On October 15, a second hurricane, Hurricane Jerry, struck Galveston, Texas. As the storm approached, Corps personnel implemented preparedness and response plans, again working with local authorities on evacuation plans. Fortunately, damage from Hurricane Jerry was minimal, so no long-term recovery effort by the Corps was necessary.

On October 17, the fourth largest earthquake in California history struck. The Corps San Francisco District and South Pacific Division offices were rendered inoperable. In accordance with its emergency operations plan, the Sacramento District assumed control to provide an immediate response. Other offices were reestablished the following day at Presidio Army Base. Late on Friday, October 20, the Federal Emergency Management Agency (FEMA) added a new, special mission and requested Corps personnel to support its individual assistance programs. By Monday, more than 300 volunteers from Corps offices throughout the country were in California, ready to provide the requested assistance. Under both its own and FEMA's authorities, the Corps provided a variety of earthquake response and recovery assistance, including: engineering; construction and contract management and oversight; preparing survey and damage reports; and nontraditional assignments from FEMA, such as conducting habitability inspections of individual residences.

In addition to supporting FEMA, the Corps has provided disaster recovery support to the General Services Administration, the Small Business Administration and the Department of Education. At times the Corps had over 1,200 personnel directly involved in disaster response and recovery operations from the events described above.

In the last six months, the Corps has responded to several flood events in the Pacific Northwest, Texas, Oklahoma, Alabama, Georgia and Florida. The Corps assisted in flood fighting and supported FEMA's disaster recovery efforts. The Corps is continuing to repair flood control works damaged by the two events.

FY 1990 GRAMM-RUDMAN-HOLLINGS SEQUESTER

FY 1990 appropriations were reduced by 1.4 percent by the President's final sequester order under the Gramm-Rudman-Hollings Act. The relatively small amount actually sequestered—$44 million—and the Corps normal reprogramming authorities will allow the Corps to manage this sequester reduction so as to have the smallest possible impact on project and study schedules and on maintenance.

PROPOSED WATER RESOURCES DEVELOPMENT ACT OF 1990

The Administration has proposed legislation to authorize a number of high priority projects and activities, as well as to modify certain cost sharing and financing mechanisms in support of the fiscal year 1991 budget. We are hopeful that the bill will be enacted as the Water Resources Development Act (WRDA) of 1990, thereby continuing the practice of biennial Civil Works authorizations.

DEPARTMENT OF DEFENSE CIVILIAN HIRING FREEZE

On January 11, the Secretary of Defense imposed a prohibition on the hiring of civilian personnel during fiscal year 1990, including Army Civil Works personnel. On April 12, an exception was approved for all transfers, reassignments and promotions within the Department of Defense. This recent exception lessens the impact on the Civil Works program, but does not address those areas in which few, if any, candidates are available within Defense, such as biologists, park rangers, dredgers and seasonal revetment laborers. Consequently, we are continuing to pursue a programmatic exception for all Army Civil Works positions.

Specifics of the Fiscal Year 1991 Civil Works Budget

CONSTRUCTION PROGRAM

The proposed construction program for fiscal year 1991 is $1.43 billion (including $224 million for the Mississippi River and Tributaries (MR&T)), 10.9 percent more than the fiscal year 1990 program. This amount includes $238 million in Federal funds to continue work initiated in fiscal year 1990 in both the Construction, General, and MR&T accounts. The focus of the proposed fiscal year 1991 program is to follow through, with few exceptions, on planning and construction projects for which initial appropriations were made in prior years and to support the environmental initiatives of the President.

The Corps of Engineers has made a commitment to the Administration, Congress, and project cost sharing sponsors to deliver sound projects on time and within budget. Follow-on requirements of new starts and other new work funded for initiation in fiscal year 1990 carry the potential to strain available funding levels over the next few years. Consequently, we made the difficult decision to defer proposing, for one year only, additional major construction new starts and to severely constrain new planning efforts. Although no major construction new starts are proposed, the fiscal year 1991 budget would fund limited other new work, such as separable elements and small project new starts in the Continuing Authorities program.

More than 100 studies and PED projects, in addition to the new starts and other new work, were initiated in fiscal year 1990. The funding and personnel resource requirements to continue these efforts also dictate that additional new planning activities be initiated in fiscal year 1991 only on an exception basis. Therefore, we are not proposing any new reconnaissance studies in fiscal year 1991, and have limited the PED new start request to two projects: one that would mitigate adverse fish and wildlife impacts of an ongoing project and one related to Indian Fishing Treaty rights.

OPERATION AND MAINTENANCE PROGRAM

The fiscal year 1991 budget of just under $1.4 billion for the Operation and Maintenance, General, account is 1.8 percent greater than the post-sequester funding level for fiscal year 1990. Although a backlog of deferred maintenance remains, the funding level which is proposed is adequate to perform current levels of operation and maintenance requirements at Civil Works projects. Most navigation harbors and channels will be dredged as the need arises—there is $372 million provided in the budget for dredging, including $55 million for maintenance dredging of small boat harbors. Funding in the amount of $158 million is provided for the continued operation and maintenance of the Corps' approximately 2,500 currently open recreation areas at Civil Works projects.

The fiscal year 1991 budget also includes $120 million for maintenance in the MR&T program, essentially the same as in fiscal year 1990.

As a percentage of the Corps total Civil Works program, the Corps budget for O&M has increased steadily over the years and in fiscal year 1991 accounts for 45 percent of the total Corps Civil Works program. As the events of a year ago have made clear, a single budget cycle does not allow sufficient time to address and resolve the many important issues that surround the O&M program of the Corps. A comprehensive review of the O&M program is urgently needed to assure that Federal expenditures for O&M are justified and are made in the most cost-effective manner. Consequently, we are initiating in fiscal year 1990, with $300,000 of available funds, a major review of policy and procedure options for project O&M. The fiscal year 1991 O&M budget includes $1.0 million to continue this effort, which would be completed during fiscal year 1992. Full use of other management studies underway will be made in this review of O&M.

Another area of concern is the increasing pressure to transport dredged material greater distances for disposal. Such proposals require careful study and raise the risk of escalating costs, without commensurate benefits. We are looking to the sponsors of Corps projects to help resolve conflicts regarding placement of dredged material and expect them to be active partners in studies concerning these issues.

REGULATORY PROGRAM

The budget request for the Regulatory Program is $75 million. Under this program, the Department of the Army is expanding its emphasis on wetlands protection in support of the President's goal of no overall net loss of wetlands. Wetlands efforts were expanded in late fiscal year 1989 with a supplemental appropriations transfer of $2 million for enforcement and wetlands training. For fiscal year 1990, these expanded efforts are proposed to be continued with the reprogramming of $4 million in funds initially allocated for the Bridge Administration program. Transfer of the Bridge Administration program from the Coast Guard to the Army was proposed for fiscal year 1990, but authorizing legislation has not yet been enacted.

The fiscal year 1991 budget of $75 million would enable us to continue our wetlands protection efforts, while improving timeliness of permit processing. Legislation will again be proposed by the Administration to transfer the Bridge Administration program to the Army. If it is enacted, supplemental appropriations will be requested to carry out the program in fiscal year 1991.

The Department of the Army concluded some important a agreements last year which will aid in strengthening its wetlands protection efforts. The Corps of Engineers, the Environmental Protection Agency (EPA), the Fish and Wildlife Service, and the Soil Conservation Service completed a new, unified Federal manual for identifying and delineating wetlands. The Army and EPA have signed a jurisdiction agreement for the Section 404 Permit program and an agreement to strengthen the Section 404 Enforcement program by defining enforcement responsibility between the two agencies. The Army and EPA also recently signed an agreement which will improve consistency in determining the type and level of mitigation required under the Section 404(b)(1) Guidelines, which established environmental criteria for the Section 404 Permit program. In addition to increasing wetlands protection, these agreements have improved program management and enhanced the working relationship between EPA and the Corps.

CHANGING PRIORITIES FOR THE CIVIL WORKS PROGRAM

The fiscal year 1991 budget proposes to place new emphasis on maintenance and restoration of the environment. Improvement of American infrastructure also is provided funding. Table B, which is attached, summarizes the initiatives which are included in the Civil Works budget.

Maintaining and Restoring the Environment.—The fiscal year 1991 budget proposes funding to initiate several important and high priority new activities to maintain and restore the environment, as well as continuing several environmental activities previously initiated by Congress.

The budget proposes funding to continue construction of juvenile fish mitigation facilities at four Corps dams in the Columbia and Snake River basins. In addition, the budget proposes initiation of a detailed analysis of the overall extent of justified fish mitigation for the main stem Lower Columbia and Snake River dams. This analysis would be closely coordinated with the Bonneville Power Administration and non-Federal regional interests.

We propose initiation of PED for Columbia River Treaty fishing access sites in Oregon and Washington, as well as initiation of mitigation PED for the Richard B. Russell project in Georgia and South Carolina. In addition, a fiscal year 1990 reprogramming allowed the Corps to take advantage of an opportunity to acquire 9,000 acres of undeveloped land in Mississippi, which now becomes part of the mitigation plan for completed portions of the Yazoo Backwater project.

We are particularly pleased that the proposed budget includes $20 million to initiate the acquisition of 88,000 acres to mitigate the adverse environmental effects of the Tennessee-Tombigbee Waterway project in Alabama and Mississippi. A proposed fiscal year 1990 reprogramming would assure that suitable land which may be available from willing sellers will not be diverted to other uses. The budget also includes follow-on funding for Missouri River navigation project mitigation PED, which will be initiated in fiscal year 1990 due to the foresight of Congress.

We also propose to initiate construction on the Davis Pond Freshwater Diversion structure in Louisiana and Mississippi, part of the Mississippi River Delta Region project.

The budget includes $5 million to carry out project modifications for the restoration of the environment under authority of Section 1135 of the 1986 Water Resources Development Act, and we have submitted a legislative proposal to extend the authority of this Section for 5 more years, until 1996. Until now, the only project funded under this authority has been a restoration demonstration project on the Kissimmee River in Florida, which Congress added to the fiscal year 1990 program.

A reformulation study is underway and will be continued in fiscal year 1991 for unconstructed portions of the Yazoo Basin project in Mississippi. The objective is to provide greater levels of urban flood protection with lesser adverse environmental impacts.

We propose two new R&D activities: a 3-year wetlands R&D program would be initiated with $3 million of funds available in fiscal year 1991 to the O&M program, where most of the benefits would be realized. Also, $500,000 would be allocated within the General Investigations R&D budget to respond to the President's initiative on global warming expressed through the Intergovernmental Panel on Climate Change and the Coordinating Council for Science, Engineering and Technology.

We also want to mention two interagency coordination efforts proposed for initial funding in fiscal year 1991: cooperation with EPA on its National Estuary program and participation in the Fish and Wildlife Service's North American Waterfowl Management program.

Improving American Infrastructure.—The fiscal year 1991 budget proposes three major activities related to improving the infrastructure of this country.

The fiscal year 1991 budget includes $5 million to continue the Construction Productivity Advancement Research (CPAR) program. This pioneering effort in cost sharing partnership with the U.S. Construction industry is off to a highly successful start. Industry response far exceeded our expectations, and it continues at a high level. This forward-looking Subcommittee, Mr. Chairman,was instrumental in the initial success of the program. We certainly appreciated the recognition given in the Committee Report of the contribution CPAR can make toward increasing our competitiveness and reducing Civil Works construction costs.

In response to the Corps 1989 invitation, 145 proposals were submitted. Of the proposals received, 56 were selected as deserving support, although the Corps was able to participate in only 17 within available funding. Our industry partners on the 17 joint ventures include construction firms, architect-engineers, materials and equipment suppliers, academic institutions, non-profit organizations, and State agencies—32 partners in all. The Corps share of the cost of these projects was $2.7 million, while the industry partners will contribute more than $7 million. The technologies to be developed will benefit industry productivity and competitiveness and will lower program costs in the Corps and Government in general. Examples of funded projects include a robotic device to place masonry sections; a method of destroying waste contaminating asbestos at building sites; improved cement for concrete; lower-cost base materials for road construction; and a simplified method for contractors to comply with Occupational Safety and Health Administration hazardous materials notification standards.

Proposals have been requested for fiscal year 1990, and we fully expect the same high level of interest that we experienced last year. The fiscal year 1991 program will begin to seek out some longer range, higher risk projects to further stimulate the construction industry to once again make R&D part of its mainstream activities.

Our second infrastructure program is another area where we acknowledge this Subcommittee's contribution by including fiscal year 1990 funds to begin work on an implementation plan for a magnetically levitated (MAGLEV) transportation system. MAGLEV offers a new concept in transportation, which, creatively developed, may provide the U.S. one of its best opportunities for economic expansion in the 21st century. MAGLEV could serve as a powerful new mode of U.S. transportation and as a globally marketable industry with technological spin-offs to other U.S. industries. The Administration supports this technology, and has included funds in the fiscal year 1991 budget to initiate concept designs for an advanced U.S. MAGLEV system. We are pooling our talents and resources with those of the Federal Railroad Administration, the Department of Energy and other Federal agencies in this important national initiative.

Pending specific MAGLEV authorization, which we have proposed, FY 1990 activities will be limited to planning and coordination. The fiscal year 1991 budget includes $3.5 million for MAGLEV to enter into cost shared efforts with private sector partners to develop concept designs.

A third area of infrastructure investment is proposed funding for a 3-year effort, to be undertaken in close coordination with other Federal agencies, to begin developing a national strategy for addressing America's infrastructure problems. Currently, there is no integrated Federal focus on infrastructure issues and no means to evaluate and implement recommendations such as those in the 1988 "Fragile Foundations" report of the National Council on Public Works Improvement. The fiscal year 1991 budget includes $350,000 to initiate discussions among Federal agencies, as well as with non-Federal public and private sector interests, to begin laying out a course of action to develop a national infrastructure strategy. During the following 2 years, recommendations would be developed to address issues such as these: modifying Federal programs to improve infrastructure development and management; public and private roles in infrastructure; the benefits associated with infrastructure and the evaluation and prioritization of public and private investment; and institutional changes needed to adequately address the Nation's infrastructure problems.

The improved technology which resulted from the recently completed Repair Evaluation Maintenance Rehabilitation (REMR) research program is expected to account for an estimated $200 million in O&M cost savings over the next five years, with the added benefit of improved safety and reliability and reduced personnel requirements. Based on the success of this effort, we propose to initiate a follow-on program, REMR II, in fiscal year 1991 to achieve further savings in other O&M areas. The proposed 7-year program will address, among other things, concrete and steel structures, geotechnical applications, hydraulics, coastal improvements, and electrical and mechanical equipment. The fiscal year 1991 budget request includes $4 million for REMR II, with an estimated total program cost of $35 million.

EXTENSIONS OF THE BENEFICIARY PAY PRINCIPLE

Several user fee changes are proposed in the fiscal year 1991 budget, some of which require authorization. User fee changes that would require authorization are an increase in harbor maintenance user fees; expansion of recreation user fees; and phased-in user fees in the Flood Plain Management Services and Planning Assistance to States programs. Legislation to implement these proposals is undergoing final Administration review and will be submitted shortly.

Harbor Maintenance User Fees.—Legislation has been proposed that would increase the ad valorem user fee on commercial cargo loaded and unloaded at U.S. ports from the current level of 0.04 percent to 0.125 percent. The proposed legislation would change the maximum charge to the Harbor Maintenance Trust Fund from 40 percent of costs to 100 percent of costs, and would authorize the recovery up to a total of $5 million of administrative costs incurred by the Corps, the Customs Service, and the Census Bureau in administering the harbor maintenance user fees program. Based on current and projected traffic, cargo value, and maintenance costs, 0.115 percent is estimated to be the fee level necessary to recover 100 percent of the costs of maintaining commercial ports and harbors, including, as just mentioned, the cost of administering the harbor maintenance program to ensure compliance with the law. The proposed legislation also would authorize the National Oceanic and Atmospheric Administration to recover its costs associated with maintaining harbors and channels, which would increase the ad valorem rate from the above 0.115 percent to 0.125 percent.

Recreation User Fees.—We again have proposed legislation to remove several restrictions on our ability to collect recreation user fees at project areas operated and maintained by the Corps. With this Subcommittee's support, we made significant progress last year toward achieving consensus on expanded recreation user fees. We are hopeful that we may be successful this year in achieving passage of the necessary authorization. Charging user fees such as those we propose is normal practice at State, local, and private recreation areas providing comparable services. Increased receipts resulting from enactment of this proposal would be requested in future years to supplement appropriations from general revenues in the same way that existing special recreation user fees are currently handled.

Flood Plain Management Services and Planning Assistance to States.—Legislation also has been proposed to extend the beneficiary pay principle to the Flood Plain Management Services program and to the Section 22 program for Planning Assistance to States. Unlike the legislation proposed last year by the Administration, this proposal recognizes the importance of giving non-Federal public and private users of these programs substantial notice of user fee requirements. Consequently, fees would be phased in over a 3-year period, gradually increasing the non-Federal share, from 10 percent to 30 percent to 50 percent.

User fee increases that are proposed to be implemented administratively are regulatory program permits, cottage site leases and shoreline management fees.

Regulatory Program Permits.—Fees for Section 10 and Section 404 permits have received a great deal of attention in recent years. The Conference Report accompanying the fiscal year 1989 Appropriations Act asked us to provide a full cost recovery plan for the regulatory program. We concur in the assessment that fees for processing permits have been unrealistically low, but we recommended a partial cost recovery plan. This plan still involves a substantial increase in permit fees. Regulations are being drafted that would increase fees from the current level of $10 for private projects and $100 for commercial projects to a range of fees from $100 to $500 for private projects and $100 to $2,000 for commercial and revenue producing projects. The draft regulations would impose processing fees at the time of application, rather than at the time of permit issuance as in the current fee system. We also are proposing to collect fees for processing jurisdictional determinations, environmental impact statements, and public hearings. We estimate that this regulatory change will increase treasury revenues by $17 million in fiscal year 1991.

Cottage Site Leases.—We have begun implementation of Section 1134 of the Water Resources Development Act of 1986, which provided that cottage site leases be continued beyond December 31, 1989, but required lease renewal to be a fair market rental. In those instances where there will be major increases in rental, such as the cottages along the Upper Mississippi and Illinois rivers, a flexible method of rental collection will be offered to allow for lower initial-year payments if the lessee desires.

Shoreline Management Fees.—At 100 reservoir projects around the Nation, the Corps permits the development of private docks and other private facilities. These permits provide a significant benefit to permittees that is not available to the general public. It is our policy to recover from the direct beneficiaries the cost of administering the program. The current charge is $30 for a 5-year permit. This charge was established in 1974 and has not been increased since that time. Studies by the Corps indicate that the current charge falls far short of recovering program costs. We are reviewing available options for recovering our costs. Prior to implementing any increases, a formal rulemaking process will be used that provides ample opportunity for the expression and consideration of public views.

SUPPORT FOR OTHERS

Because of its technical expertise and organizational infrastructure, the Corps often is called upon to provide engineering and construction management services to other agencies. During fiscal year 1989, the Corps provided support to 26 Federal agencies. Some support also was provided to State and local Governments in cases where the Corps has a capability not readily available in the private sector.

The largest work for other activity continues to be support for EPA's Superfund and Wastewater Treatment Construction Grants programs.

We continue to solidify the partnership between the Corps and EPA and are discussing with them additional ways the Corps' expertise may be called upon to support the Superfund program. We especially are proud of the Corps performance in assisting EPA to satisfy its congressional mandate to have 175 projects under construction by October 16, 1989. As EPA has reported to Congress, construction contracts were awarded by the October deadline on more than 175 projects. Of these, the Corps was responsible for delivering 29, about one-third of the Federal-lead projects on the list.

New work undertaken by the Corps in fiscal year 1989 includes: construction supervision support to the National Aeronautics and Space Administration for its $650 million advanced solid rocket motor project at Yellow Creek, Mississippi; and assistance to EPA's Great Lakes National Program Office in a study and demonstration program relating to the control and removal of toxic pollutants in the Great Lakes.

We are interested in providing support to the Department of Energy (DOE) on its Supercollider, New Production Reactors, and radioactive waste cleanup programs, and we have had some preliminary communications with Admiral Watkins and other DOE officials on these subjects. On Supercollider, we helped DOE develop a management plan, and we are currently providing certain real estate services for the project.

As part of the Nation's war on drugs, we have offered the Corps' engineering support to the Federal Bureau of Prisons as it increases prison capacity. This support would be provided in conjunction with the recently created Department of Defense Bureau of Prisons Assistance Council, which is responding to the Attorney General's request for help in obtaining prison sites on military properties affected by the Base Closure and Realignment Act. Finally, we are continuing negotiations with the State Department concerning Corps support on its Embassy Construction program.

CONCLUSION

Mr. Chairman, we want to emphasize our support for the President's amended fiscal year 1991 budget, which addresses changing priorities while facing squarely the severe constraints imposed by the Federal deficit. We are hopeful that the Subcommittee will be able to support this budget.

Mr. Chairman, this concludes my statement.

TABLE A
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - CIVIL WORKS
FISCAL YEAR 1991 BUDGETED PROGRAM
(Dollars in Thousands)

APPROPRIATION TITLE	FEDERAL FUNDS				NON-FEDERAL FUNDS			TOTAL PROGRAM FUNDING		
	TRUST FUNDS			TOTAL FEDERAL BUDGET REQUEST	RIVER & HARBOR CONTRIBUTED FUNDS					
	INLAND WATERWAYS	HARBOR MAINTENANCE	GENERAL FUNDS		REQUIRED	ANCILLARY	TOTAL	INITIAL	LATER LEG b/	TOTAL
GENERAL INVESTIGATIONS	-	-	135,400	135,400	19,500 a/	1,500	21,000	156,400	-	156,400
CONSTRUCTION, GENERAL	132,800	-	1,077,370 c/	1,210,170	145,500	30,400	175,900	1,386,070	2,000	1,388,070
OPERATION AND MAINTENANCE, GENERAL	-	485,500 d/	897,455 e/	1,382,955	4,000	3,000	7,000	1,389,955	-	1,389,955
REGULATORY PROGRAM	-	-	75,100	75,100	0	-	0	75,100	4,000	79,100
F.C., MISSISSIPPI RIVER & TRIB'S	-	-	330,867 f/	330,867	3,000	100	3,100	333,967	-	333,967
GENERAL EXPENSES	-	-	121,100 g/	121,100	0	-	0	121,100	-	121,100
FLOOD CONTROL & COASTAL EMERGENCIES	-	-	25,000	25,000			0	25,000	-	25,000
REVOLVING FUND	-	-	0	0	0	-	0	0	-	0
PERMANENT APPROPRIATIONS	-	-	12,000	12,000	0	-	0	12,000	-	12,000
TOTAL	132,800	485,500	2,674,292	3,292,592	172,000	35,000	207,000	3,499,592	6,000	3,505,592

a/ Includes $1.5 million under proposed legislation for phased-in cost sharing in the Flood Plain Management Services and Planning Assistance to States programs.

b/ Proposed for later transmittal pending enactment of authority to transfer the Bridge Alteration Program from the Coast Guard.

c/ Includes reduction of $15.83 million in anticipated savings associated with proposed reform of the Davis-Bacon Act.

d/ Includes $192.5 million under existing legislation and $293 million in receipts which would result under proposed legislation to raise the ad valorem fee from 0.04 to 0.125 percent of cargo value.

e/ Includes $20.0 million to be derived from the Special Recreation Use Fee account and an offset of $6.545 million in anticipated savings associated with proposed reform of the Davis-Bacon Act.

f/ Includes reduction of $3.633 million in anticipated savings associated with proposed reform of the Davis-Bacon Act.

g/ Reflects reduction of $15 million due to corresponding increase in carry over from anticipated FY 1990 outlay-neutral supplemental appropriations to cover expenses resulting from a March 1990 fire at the Corps of Engineers headquarters building.

TABLE B
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - CIVIL WORKS
FISCAL YEAR 1991 BUDGETED PROGRAM
(Dollars in Thousands)
FISCAL YEAR 1991 INITIATIVES (1)

APPROPRIATION TITLE/PROJECT NAME	BUDGET REQUEST
ENVIRONMENTAL MAINTENANCE AND RESTORATION:	
GENERAL INVESTIGATIONS	
Climate Change Research Program - Research & Development	$ 500
Columbia River Treaty Fishing Access Sites, OR and WA (PED)	450
Coordination With Other Agencies:	
National Estuary Program	200
North American Waterfowl Management Program	200
Missouri River Fish and Wildlife Mitigation, IA, NE, KS and MO (PED)	429
Richard B. Russell Dam and Lake, Wildlife Mitigation, GA and SC (PED)	300
CONSTRUCTION, GENERAL	
Columbia River Juvenile Fish Mitigation, WA, OR and ID	15,800
Project Modifications for Improvement of the Environment (Section 1135)	5,000
Tennessee-Tombigbee Waterway Wildlife Mitigation, AL and MS	20,000
OPERATION AND MAINTENANCE, GENERAL	
Wetlands Research Program	3,000
FLOOD CONTROL, MISSISSIPPI RIVER AND TRIBUTARIES	
Davis Pond Freshwater Diversion Structure-MS River Delta Region, LA & MS (Constr)	945
Yazoo Basin Backwater Project Mitigation, MS (Constr)	250
Yazoo Basin, MS - Reformulation Study	5,900
TOTAL - ENVIRONMENTAL MAINTENANCE AND RESTORATION INITIATIVES	52,974
INFRASTRUCTURE IMPROVEMENT:	
GENERAL INVESTIGATIONS	
Federal Strategy for America's Infrastructure	350
Magnetic Levitation Transportation Pilot Program	3,500
OPERATION AND MAINTENANCE, GENERAL	
Repair Evaluation Maintenance and Rehabilitation Research (REMR II)	4,000
TOTAL - INFRASTRUCTURE IMPROVEMENT INITIATIVES	7,850
TOTAL - FISCAL YEAR 1991 INITIATIVES	$ 60,824

(1) Includes Administration initiatives as well as Administration support for initiatives begun by Congress in prior years.

STATEMENT OF LT. GEN. HENRY J. HATCH

Senator JOHNSTON. Thank you very much, Mr. Secretary. Before I ask any questions, let us hear from all the witnesses.

General Hatch?

General HATCH. Mr. Chairman, again, I am honored to be testifying before you today on the President's fiscal year 1991 amended budget for the Army Corps of Engineers' civil works program, and, as you suggested, in order to conserve time I will summarize my complete statement which, with your permission, I will submit for the record.

FISCAL YEAR 1990 PROGRAM

First, a comment on our fiscal year 1990 program—we know we face a real challenge in initiating the numerous new study and construction starts that were funded by the Congress for this current year. And to ensure their orderly execution we also need to absorb the associated increase in follow-on funding. This precluded our requesting such new starts in fiscal year 1991.

Now, we are awaiting enactment of an emergency supplemental appropriation to help overcome some operational problems brought on by unanticipated events. As you know, we need some $20 million for the "Flood control and coastal emergencies" account, which is almost depleted due to the extensive emergency response activities of the last 6 months, and some $15 million for the "General expenses" account to cover expenses having resulted from the fire in our headquarters here in Washington on March 23.

FISCAL YEAR 1991 PROGRAM

Moving to our 1991 program—that program addresses not only development needs of the Nation, but also the administration's priority concern for the environment, as indicated by 13 new environmental initiatives in our budget. We remain committed to development, but we must find ways to proceed that do not erode our natural resources base for future generations.

The January budget request has been amended to reflect an estimated $26 million in savings based on proposed reforms in the Davis-Bacon Act and a reduction of $15 million to the "General expenses" account consistent with the administration's supplemental proposing an outlay neutral transfer of $30 million from the "Construction general" account in fiscal year 1990.

The resulting $3.29 billion appropriation request is based on several legislative and administrative changes that increase non-Federal funding of the program by $331 million. The proposed changes will raise the non-Federal share, including the trust funds and contributed funds, to $842 million. This increase is needed to fund currently planned work at optimum levels within budget deficit targets.

With the administration's approval, we are initiating, in close coordination with other Federal agencies, a 3-year effort to begin developing a Federal action strategy for maintaining, rehabilitating, and developing the Nation's infrastructure. This effort will entail review of selected strategies, including those of the National Council on Public Works Improvement. We are also working with key interests, in and out of the Government, to investigate the potential of high-speed transportation using magnetic levitation.

IMPROVED BUSINESS MANAGEMENT

Given the importance of what we do, we are also concerned with how we do it. In order to better serve our customers, we have undertaken an array of initiatives designed to improve the effectiveness and efficiency of our operations. I would like to mention two of them.

In view of the substantial and increasing resource commitments required for our O&M program, we are initiating a comprehensive review this year to assure that all work is justified and cost effective. With your permission, Mr. Chairman, I will submit, for the record, the plan of study for that review.

Coincidentally, as part of our research and development program, our fiscal year 1991 budget contains funding for new research and development efforts to provide improved procedures and technologies for project operations and maintenance. Additionally, it also provides for a 3-year wetlands research and development effort to find new and improved methods for managing, protecting, and restoring wetlands.

PREPARED STATEMENT

In conclusion, Mr. Chairman, we are committed to working with our sponsor partners to provide sounder cost-shared products. We are striving to maintain and enhance our expertise, enhance the environmental aspects of our work, improve our effectiveness and efficiency, and reduce the costs of doing our business. We are committed to better serving our great Nation and are looking forward to working with you and this committee to that end.

Sir, that concludes my statement.

[The statement follows:]

STATEMENT OF LT. GEN. H.J. HATCH

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

INTRODUCTION

I am honored to be testifying to you today, along with the Assistant Secretary of the Army for Civil Works, Mr. Robert W. Page, on the President's FY 1991 amended Budget for the Army Corps of Engineers' Civil Works Program.

Thanks to your support, the Civil Works Program is vigorous, and I look forward to your continued support for this very important program, so beneficial to our Nation.

My statement addresses these four topics:

- Fiscal Year (FY) 1990 Program,
- FY 1991 President's Budget, as amended,
- Improved Business Management, and the
- Legislative Program.

FY 1990 PROGRAM

Execution

The execution of the FY 1990 Program will be particularly challenging because of the number of new starts and other new work funded in the General Investigations and the Construction, General, programs.

In order to accommodate the increases to the General Investigations Program, some 25 of the new reconnaissance studies were funded at levels less than the required amounts. This will necessitate additional appropriations in FY 1991, or later, to complete these reconnaissance studies, and delay start of the follow-on feasibility studies until late FY 1991 or early FY 1992. To minimize this impact, we intend to reprogram available funds, to the fullest extent practicable, to provide the full FY 1990 requirements for these studies.

The FY 1990 appropriations also provided reduced funding for the 23 new preconstruction engineering and design/studies. This will delay the studies somewhat, prolonging the completion.

In the Construction, General, Program, the added new starts and the other new work have contributed to a program with a funding level nearly 15 percent larger than that for the program in FY 1989. We will have to work closely with the sponsors to obtain the Local Cooperation Agreements required for the 23 added new starts in order to execute the funded program successfully.

Impacts of Sequestration and FY 1990 Pay Raise Absorption

In accordance with the Gramm-Rudman-Hollings (GRH) law, 1.4 percent of the amounts appropriated for our programs, projects, and activities was sequestered. The total sequestration for the Corps' civil program was $44 million, leaving $3.12 billion available. Given our reprogramming authority, we expect the resultant impact from the slippage in the execution of the funded activities and projects to be minor.

The 1990 pay raise of 3.6 percent for the civil program workers totals $37 million of which some $28 million will have to be absorbed within the FY 1990 appropriations. This may make it somewhat more difficult to maintain our work force at the authorized full strength, and may result in hiring delays, but the impact is certainly manageable.

Hiring Freeze

On 11 January of this year the Secretary of Defense imposed a prohibition on the hiring of civilian personnel during FY 1990. This freeze covered all DOD elements, including our civil program. Subsequently, on 12 April, he granted exceptions from the freeze, including permission to transfer, reassign, or promote civilian DOD employees, and to reappoint temporary employees, provided there would be no break in service. This will lessen, somewhat, adverse impacts the freeze will have on us, but, in some instances, provides no relief. For example, it is of little help in the revetment program in which we hire temporary workers following breaks in service.

Dire Emergency Supplemental Appropriation

An FY 1990 dire emergency supplemental appropriation is under consideration by Congress. In the absence of completed action, the Administration has assumed that this appropriation will provide $20 million for the Flood Control and Coastal Emergencies program, and will provide for transfer of $30 million in Construction, General, funds to the General Expenses account to pay costs of the Corps headquarters fire of 23 March. These costs, estimated to total $15 million, include costs to relocate and provide temporary office space for approximately 250 workers, and costs to clean, repair, and replace Corps equipment and furnishings damaged in the fire. In order to produce an outlay-neutral proposal, an additional $15 million would be transferred to adjust for the significantly different outlay spendout rates for these accounts. An FY 1991 Budget amendment has been proposed to reduce the General Expenses account by the additional $15 million.

Overview

As the Assistant Secretary has said, the FY 1991 Program is a good one. For the first time, the Corps is submitting a budget which addresses not only the developmental needs of the Nation, but also the priority concern for preserving the environment from which we take sustenance and on which progress. The 13 environmental initiatives run the gamut from new research and development efforts designed to find methods and techniques for planning projects which are not environmentally threatening, to the mitigation of the adverse impacts of the past actions. Together, they clearly represent a comprehensive approach.

We truly believe that, in order to protect our agricultural, industrial, and technological economies, we must find environmentally sustainable ways to proceed. Ours is not an anti-development posture; rather, it is a rational, sensitive, water resources development posture that looks to the future as well as the present.

Summary

In addition to the FY 1991 budget amendment for the General Expenses account, another amendment has been submitted, reducing three other accounts by $26 million - the savings associated with reforms being considered by the Congress for the Davis-Bacon Act. As shown in Table A, funding of the FY 1991 Program totals $3.5 billion, including Federal appropriations of $3.29 billion and anticipated non-Federal contributions of $207 million. It includes $3.44 billion for continuing work and $61 million for the recommended initiatives.

The FY 1991 request, as amended, for the Federal funding exceeds the FY 1990 post-sequestration appropriation by almost $154 million, with a corresponding increase of $47 million in contributions. Most of this $201 million total is attributable to the follow-on funding for the FY 1990 new starts. Also included is an allowance of some $51 million to cover the costs for the 3.6 percent pay raise approved for FY 1990 and 50 percent of the proposed pay raise of 3.5 percent for FY 1991.

Extension of the Beneficiary-pay Principle

Consistent with the President's commitment to the user fees and the other beneficiary contribution authorities, this budget is based on several legislative and administrative changes to better finance the program. A breakdown of the planned increases in the non-Federal share, amounting to $331 million, is shown in Table B.

For the past two fiscal years, the non-Federal share has amounted to about 11 percent of the total Federal funds appropriated for expenditure. The proposed changes in cost sharing and user fees will raise the overall level of non-Federal contributions to about 25 percent of Federal funding. Most of the $331 million in new receipts would be available for appropriation to fund the Corps program and further reduce the amount of general funds required from the Treasury to pay for the Corps program. Given the growth in program funding since FY 1986, such an increase is needed if work currently planned is to be funded at an optimum level and the budget deficit targets are to be met.

The increase in the ad valorem fee, which generates receipts for the Harbor Maintenance Trust Fund, is intended to put financing of commercial navigation maintenance on a basis similar to that required by the Water Resources Development Act of 1986 for other purposes - with the beneficiaries, in lieu of a designated project sponsor, paying 100 percent of the allocated costs for such work. Since both imports and exports are subject to the fee, the proposed increase should not cause any discernable diversion of U. S. cargo.

Additionally, authority is being sought to collect camping fees and fees for day use facilities, similar to the authority already given the U. S. Park Service. Together, the existing and proposed recreation fees would generate some $40 million in funds which is about 25 percent of the amount being requested for the operation and maintenance of Corps recreational facilities.

Cost sharing changes also are being proposed to assure that the non-Federal share will be the same for all beneficiaries of comparable services. We propose to cost share the technical services of planning and engineering currently being provided under the Corps' Planning Assistance to States Program, with the recipients paying up to 50 percent of the cost of such services. Similarly, certain services provided under the Flood Plain

Management Program, e. g., the delineation of a floodway or the conduct of a hurricane evacuation study, which require the acquisition of new data or the undertaking of extensive technical analyses, also will be cost shared. Ultimately, the cost sharing will be the same (50 percent) as that required for feasibility studies. To ease the financial impacts on local sponsors, we propose to phase in the level of the cost sharing over a three year period, so that 10 percent would be required in FY 1991, 30 percent in FY 1992, and 50 percent thereafter.

Administratively, additional user fees will be levied for some of the technical services currently being provided specific beneficiaries, generally at Federal cost. Regulations are being drafted that will permit the collection of fees for providing technical data readily extractable from the available Flood Plain database and for processing permit applications and other requests under our Regulatory Program. In these cases, a variable fee schedule will be applied, reflective of the effort required for response to the individual requests.

Other Program Initiatives

We are quite proud of the engineering and construction support we provide to other Federal agencies on a reimbursable basis. Not only do the other agencies and taxpayers benefit from this support, but so do we in that our staff gains valuable experience for use in our traditional programs. Our diverse experience in civil, military, and other agency programs enables us to respond to whatever national problem we may be called upon to solve.

As the Assistant Secretary indicated, our biggest customer is the Environmental Protection Agency, which accounts for 77 percent of this work. The Federal Emergency Management Agency, Department of Energy, Department of Interior, and National Aeronautic and Space Administration account for most of the work for the remaining 26 Federal agencies we support. We stand ready to be of assistance to other Federal agencies as they address the Nation's problems.

One of this Nation's critical and growing problems is its overburdened and deteriorating infrastructure. Little thought was given to the long term operation, maintenance, and rehabilitation costs that our infrastructure system would place on the shoulders of future generations. It is clear that we need to develop solutions today to rebuild our infrastructure with systems which promise reduced financial burdens for tomorrow.

One important initiative being funded focuses on opening a dialogue with key public and private sector interests, including other Federal agencies, on this Nation's many infrastructure problems, including those involving water resources, water supply, transportation, water quality, energy, and solid and hazardous wastes. Presently, there is neither an integrated Federal infrastructure policy nor an organization to coordinate discussions and serve as a catalyst in development of such policy. With the Administration's approval, we are initiating a 3-year effort that should lead to a set of recommended actions. These would be based on the assumption that the Nation's infrastructure needs have already been adequately defined and would entail examining selected strategies, including those of the National Council on Public Works Improvement, to determine what is needed to move to an implementation phase.

MAGLEV, the high speed transportation system using magnetic levitation, under investigation by the Corps, Department of Energy, Federal Railroad Administration, and other Federal agencies, shows promise of being responsive to one of our infrastructure needs. The national MAGLEV initiatives now being planned would combine Government and U. S. private sector talents and assets to develop an advanced transportation system for deployment during the next century. This system has the promise of low operation and maintenance costs, minimum impact on the environment, and high transport productivity.

IMPROVED BUSINESS MANAGEMENT

The Corps strives to improve both its effectiveness and its efficiency in order to reduce the cost of its business operations. To this end, we have placed renewed emphasis on performance measures; initiated several organizational studies; focused time and energy on the development of the new leaders for the 21st Century; and increased the share of our research and development program dedicated to product and process improvements.

Effective Organization

We have begun several efforts to evaluate our organization in order to improve its effectiveness.

In keeping with the spirit of the FY 1990 Conference report, we will conduct a broad-based conceptual study of alternative organizational structures for our field operating agencies, with a view to:

- reducing program costs without adversely impacting quality of service;
- identifying factors and criteria for shaping most efficient organizational structures;
- identifying existing constraints against implementation of improved structures; and
- identifying factors, criteria, and constraints most relevant to organizational structures best for addressing the Nation's future engineering and environmental challenges.

Findings of this conceptual study will be considered, along with other pertinent information, by all interested parties, including Congress, in ultimately deciding whether to implement an alternative structure.

As mentioned by the Assistant Secretary, we propose a comprehensive review of management and resourcing policies and procedures for our Operation and Maintenance, General, and Flood Control, Mississippi River and Tributaries maintenance programs, with a view to providing continued or improved service under circumstances of deficit reduction and budget limitations. To this end, a plan of study has been prepared to guide a 1 1/2-year effort to address existing program productivity; intensive management; divestiture; modernization; and program development, execution, and monitoring procedures.

In late FY 1989, the Assistant Secretary challenged us to determine ways and means to maintain and enhance recreational opportunities, while reducing the Federal financial burden of operating and maintaining our recreation facilities. Accepting this challenge, we recently began such a study and established a task force to manage it. The task force includes a Policy Steering Committee chaired by the Deputy Chief of Engineers, General Kem, a Management Team to provide required recreation resource management expertise, and a study manager from our Institute for Water Resources. We have briefed staffs of involved Congressional authorization and appropriation committees and several interested regional groups on this study. Additionally, we have advised all State Governors of the study by letter, and asked for any comments. A few have responded, all with offers to assist.

And, finally, in coordination with OMB, the Corps will undertake a workforce management analysis to examine how manpower and funding are related in order to better predict manpower needs.

Project Management

The Corps is continuing its effort to improve work management. In fact, I recently reorganized headquarters for this very purpose.

Project management is afforded by the Life Cycle Project Management System, implemented in FY 1988 for the Corps' civil program, and through the recent reorganization, for its military program.

The guiding principle founding this system is that we work closely with customers to ensure they get sound, mutually agreed upon products in a timely, cost-effective manner. To this end, we have established the civilian position of Deputy District Engineer for Project Management in each of our 36 districts. Deputies in these positions provide leadership to individual project managers and project management teams who, in turn, provide leadership to project participants, including local sponsors.

In continual consultation with local sponsors, and in consonance with their views, to the fullest extent practicable, project managers and management teams develop, justify, and execute projects through construction. To this end, they develop project management plans, reflecting optimum costs and performance schedules. They continually assess progress against these schedules and, based on findings, take action to comply with or modify management plans, in order to complete projects in the most satisfactory ways possible.

We must and will meet our commitments to you and our partners.

Program Management

Program management has been accomplished, to a large degree, by our long-standing programming organization. Under our recent reorganization, the role of this organization was strengthened in that all facets of the civil program were incorporated into the Civil Works Directorate, under the leadership of General Kelly, who assigned program management overview to Programs Division. In its new role, this division will, in addition to its traditional role of developing and defending the civil program, develop a strong analytic capability to assist the Director in answering some of the more difficult questions he will face in dealing with a stable program and declining resources.

Human Resource Management

Creating the individual and organizational competence to meet the challenge of the future is foremost in my mind. We have started a major program to shift our management team's focus toward human resource management, as distinguished from the more paper focused activities of personnel administration. As we become more adept at identifying, understanding, developing, and positioning talent in an environment that is challenging and supportive, we approach our human resources management goal of becoming an employer of choice. With what we know regarding the workforce of the future and the diminishing resources of today, we can't afford to do any less. At the cornerstone of our program is:

- aligning our people and systems for leading, managing and developing people with our vision, mission, and challenges; and

- understanding people in order to achieve the best fit between the person and the job (getting the right people into the right job doing the right things in the right environment).

Leadership Enhancement and Development

The development and enhancement of leadership are key to the success of much of what I've talked about here today. I am continuing and increasing the emphasis on leadership initiated by General Heiberg. We have several initiatives ongoing in this area. Perhaps the most significant one is the consideration of leadership in the selection process. I have advised all selecting officials that they must weigh leadership abilities when making selections. For executive positions, we've developed a method that adds a measure of leadership competence to the selection process.

We are also exploring ways, within the limited flexibility of the Federal classification system, to establish a program to encourage workers at the journeyman level to decide on a career path which is primarily either technical or managerial, so that their training programs can be built around their career goals. Under this program, Corps managers will identify Corps workers with leadership potential, then target them for leadership grooming. Our goal is to develop leadership capabilities of the kind needed to lead the Corps into the 21st Century.

Research and Development

As part of our research and development to improve products and lessen their costs, we recently completed the Repair Evaluation, Maintenance, and Rehabilitation (REMR) I program. Savings from this program are expected to reach $200 million over the next five years. Our FY 1991 budget provides funding for an initiative, REMR II, and continuation of a range of ongoing work, including Construction Productivity Advancement Research and the Dredging Research program. REMR II and the Dredging Research programs are intended to yield improved procedures and technologies to reduce costs of project operation and maintenance, long-term. REMR II will address concrete and steel structures, and geotechnical, hydraulic, and coastal engineering problems, and is expected to result in savings comparable to those of its very successful precursor, REMR I.

We also propose initiating a 3-year, $22 million, Wetlands Research and Development Program to help the Nation's wetlands. This program is aimed at developing practical new and improved methods and techniques that can be applied effectively in managing, protecting, and restoring all established inland wetlands.

LEGISLATIVE PROGRAM

Overview

During their work to produce the landmark Water Resources Development Act of 1986 (WRDA 86), following a 16 year hiatus in major authorization bills, the Administration and Congress worked together to reestablish a two-year cycle for such authorizations. This led to WRDA 88, furthering the important cost sharing reforms of WRDA of 1986, and adopting the idea of limited-size authorization bills compatible with realistic budget considerations.

Development Principles

We have completed development of proposed legislation for Congress for a WRDA 90. This legislation is based on five principles which we believe are essential to passage of the act. They are to:

- maintain the reforms of WRDA 86 and 88, preserving cost sharing principles and policies;
- limit the number and cost of projects for authorization, scoping legislation to be consistent with spending objectives;
- ensure that projects for authorization are economically justified, environmentally sound, and have been fully reviewed by the Executive Branch;
- advance the FY 1991 budget proposals for cost recovery in Army water resources projects; and
- promote use of Corps expertise in partnership with the private sector to address infrastructure needs and to assist other governmental agencies.

We believe that adherence to these principles will lead to passage of WRDA 90. Biennial authorizations are important to the orderly, predictable execution of our civil works mission, and, in turn, strengthening of partnerships with non-Federal sponsors. These authorizations also promote optimal use of our technical, scientific, and management capabilities.

TABLE A
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - CIVIL WORKS
SUMMARY OF PROGRAM AMOUNTS FOR FISCAL YEARS 1989, 1990, AND 1991
(Dollars in Thousands)

APPROPRIATION TITLE	FY 1989 (Approp.)	FY 1990 (Approp.) a/	FY 1991 Budget Request
GENERAL INVESTIGATIONS	142,405	129,251	135,400
CONSTRUCTION, GENERAL			
General Funds	1,110,266	936,477 e/	1,077,370 b/ f/
Inland Waterways Trust Funds	69,644	117,334	132,800
TOTAL APPROPRIATION	1,179,910	1,053,811	1,210,170
OPERATION AND MAINTENANCE, GENERAL			
General Funds	1,195,588	1,176,795	877,455 f/
Special Recreation Use Fees	15,000	19,720	20,000
Harbor Maintenance Trust Funds	159,026	161,704	485,500 c/
TOTAL APPROPRIATION	1,369,614	1,358,219	1,382,955
REGULATORY PROGRAM	63,752	68,455	75,100 b/
F.C., MISSISSIPPI RIVER & TRIB'S	337,980	330,296	330,867 f/
GENERAL EXPENSES	122,600	156,997 e/	121,100 e/
F.C. & COASTAL EMERGENCIES	20,000	20,000 d/	25,000
REVOLVING FUND	0	9,860	0
PERMANENT APPROPRIATIONS	12,000	12,000	12,000
TOTAL, FEDERAL BUDGET AUTHORITY	3,248,261	3,138,889	3,292,592
RIVERS AND HARBORS CONTRIBUTED FUNDS	129,596	160,000	207,000
TOTAL PROGRAM	3,377,857	3,298,889	3,499,592

a/ Reflects G-R-H sequester of 1.4 percent.

b/ Excludes $2 million for CG and $4 million for O&M,G accounts which is proposed for later transmittal pending enactment of authority to transfer the Bridge Alteration Program from the U.S. Coast Guard.

c/ Includes $293 million which depends upon enactment of proposed legislation.

d/ Reflects House passed FY 1990 supplemental appropriation.

e/ Reflects FY 1990 outlay-neutral supplemental under consideration by Congress transferring $30 million from the CG account to the GE account to cover expenses from a March 1990 fire at Corps headquarters building. Of the $30 million, $15 million would be carried over and used to reduce the FY 1991 budget request for the GE account

f/ Reflects following reductions in anticipated savings associated with proposed reform of the Davis-Bacon Act: CG -$15.83 million: O/M,G -$6.545 million; and MR&T -$3.633 million

CONCLUSION

We want to find and implement new ways to better accommodate customer's needs and resources, that is, to provide them with the products they want within mutually agreed upon costs and schedules. To this end, we strive to improve effectiveness, efficiency, equitable cost sharing, and cost of our business operations.

We are trying to become more effective and efficient by better applying our human resources. This entails studying ways and means to improve operations through use of standards, reorganization, and leadership. Also, as discussed by the Assistant Secretary, we are exploring opportunities for partnering with private industry, whereby we engage contractors at project start in order to improve understanding and trust, and, ultimately, to expedite negotiations for work execution. We are tailoring our products to better serve our customers needs and resources, and are assuring delivery within costs and schedules through improved program and project management. This has brought into focus that project proponency is the role of local sponsors; not the Corps. Furthermore, it has enabled measuring and managing quality, cost, and time, accurately.

We are trying to distribute operation and maintenance costs more equitably by exploring opportunities to increase beneficiary cost sharing for harbor and recreation facilities and regulatory activities. And, finally, we continue to research and develop ways and means to improve products and reduce their costs.

In summary, we are committed to better serving our many customers and, through them, our great Nation, and are ever looking forward to working with you to this end.

TABLE 8
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - CIVIL WORKS
NON-FEDERAL SHARE OF FY 1991 PROGRAM
(Dollars in Thousands)

	CURRENT AUTHORITIES & REGULATIONS				PROPOSED AUTHORITIES & REGULATIONS				RESULTANT INCREASE			
	USER FEES		COST SHARED		USER FEES		COST SHARED		USER FEES		COST SHARED	
APPROPRIATION TITLE	TRUST FUNDS	OTHERS	a/ (RIV/HBR TR)	TOTAL	TRUST FUNDS	OTHERS	a/ (RIV/HBR TR)	TOTAL	TRUST FUNDS	OTHERS	a/ (RIV/HBR TR)	TOTAL
GENERAL INVESTIGATIONS	-		18.000	18.000	-	200 f/	19.300 j/	19.500	-	200	1.300	1.500
CONSTRUCTION, GENERAL	132.800 b/	-	145.500	278.300	132.800	-	145.500	278.300	-	-	-	0
OPERATION AND MAINTENANCE, GENERAL	192.500 c/	20.000 d/	4.000	216.500	485.500 g/	40.000 h/	4.000	529.500	293.000	20.000 h/	-	313.000
REGULATORY PROGRAM	-	500	-	500	-	17.000 i/	-	17.000	-	16.500	-	16.500
F.C., MISSISSIPPI RIVER & TRIB'S	-	-	3.000	3.000	-	-	3.000	3.000	-	-	-	0
GENERAL EXPENSES	-	-	-	0	-	-	-	0	-	-	-	0
FLOOD CONTROL & COASTAL EMERGENCIES	-	-	-	0	-	-	-	0	-	-	-	0
PERMANENT APPROPRIATIONS	-	12.000 e/	-	12.000	-	12.000	-	12.000	-	0	-	0
TOTAL	325.300	32.500	170.500	528.300	618.300	69.200	171.800	859.300	293.000	36.700	1.300	331.000

a/ Non federal cash contribution required in accordance with WRDA, 1986 provisions.

b/ Derived from fuel tax receipts collected for the Inland Waterways Trust Fund

c/ Derived from ad valorem tax receipts (0.04 % of cargo value) collected for the Harbor Maintenance Trust Fund

d/ Derived from user fees collected and deposited in the Special Recreation Use Fee account

e/ Derived from user fees (including lease funds) collected and deposited in a permanent appropriations account

f/ To be generated from user fees administratively charged for providing technical data and assistance extracted from available data

g/ Reflects an increase in Harbor Maintenance Trust Fund receipts resulting from raising ad valorem fee from 0.04 to 0.115 % of cargo value

h/ Reflects an increase in user fees to be collected and deposited in the Special Recreation Use Fee account. Added fees would not be available for appropriation until FY 1992

i/ Governmental receipts to be generated from increased user fees administratively charged in processing permits and other requests

j/ Reflects increased contributions for services provided the beneficiaries, consistent with cost sharing provisions of WRDA, 1986

MAGLEV RESEARCH PROGRAM

Senator JOHNSTON. Thank you very much, General Hatch.

General Kelly, did you have a statement?

General KELLY. No, sir; I do not.

Senator JOHNSTON. I will have some questions in writing, but, just briefly, I want to ask one first of all on Maglev. Does the capacity of this country to manufacture magnets impact heavily on the future of Maglev as you see it?

General KELLY. Mr. Chairman, I will answer that.

That is one of the issues that we will be investigating during our partnership with the Federal Railroad Administration, DOT, as we develop the whole Maglev technology. What we are after in Maglev is to develop a second generation, the first generation having been developed by the Germans and Japanese, that is based on superconducting magnets, which we have not quite perfected yet. So yes, the magnet-producing capacity of our country will dramatically affect Maglev.

Senator JOHNSTON. Well, in the superconducting super collider [SSC], as you know, they have got those magnets, and I am wondering how the manufacturing technology from the superconducting super collider will impact the Maglev program.

General KELLY. Very closely; they use almost the same type of magnet.

Senator JOHNSTON. So, if we get the manufacturing technology from SSC, it will help?

General KELLY. Yes sir; a direct application.

Senator JOHNSTON. Do you see Maglev as having a great future in the country and around the world?

General KELLY. Well, that is what we are going to be studying. Clearly there is a market for it in this country. The Europeans and Japanese have developed high-speed rail, while we have not. We have not concentrated a lot on our rail industry, so there is opportunity for application of either high-speed rail or Maglev in this country.

Senator JOHNSTON. The indication is that it is very hopeful?

General KELLY. Yes, sir; I believe it is.

WETLANDS USE POLICY

Senator JOHNSTON. Secretary Page, I have spent a lot of time lately with irate constituents regarding the new wetlands regulations. There are two areas of concern in agriculture. We were going to put an amendment in the appropriations bill, but were talked out of it on the ground that an agreed to statement of policy was about to be issued. We thought we would have that. The bill came and left, and then we got the statement of policy, which did not tell us very much, particularly with respect to aquaculture in Louisiana.

I hope you will look at the aquaculture issue, because it is a very big thing in our State—crawfish and catfish farming as well as other things. I think converting rice fields to crawfish ponds is normal agricultural practice, but having to go through this permitting process every time is very, very intrusive to people who do not have regular lawyers and who are not used to all of that bureaucratic delay. I hope you will take a look at that.

Mr. PAGE. Yes, sir; Mr. Chairman, I am very familiar with a lot of outcries from around the country over that MOA, and, as a result, we are now working to clarify the delineation manual because, as you say, it needs it. I have talked to agriculture groups and know they are very disturbed over the manual.

Senator JOHNSTON. As you know, we have a special wetlands problem in Louisiana. No one is more concerned about wetlands than I am. We are losing 40 to 60 square miles of coastal wetlands a year.

Now, we are not losing those because farmers are putting them into rice fields. We are losing them mainly because of subsidence, and I think you have probably seen those maps. Those maps show the footprints of the Mississippi River in four different stages. I think that shows very graphically what Louisiana's problem is, which is not to say that we do not have some adverse impacts elsewhere. But coastal wetlands, that is our real problem, and so I hope we do not try to regulate our way to a no net loss policy, because it will not work in Louisiana.

Would you like to respond to that?

Mr. PAGE. Yes, sir, Mr. Chairman. I can well and vividly remember your statement last year at this hearing. It caused us to begin a series of actions which I think will eventually take care of the problem.

Like you stated, up to 60 square miles of coastline are lost each year. Where and how do we mitigate that? We discussed that, along with the problem in Alaska, at a Domestic Policy Council meeting, and concluded that these are unique problems. They are going to be addressed with the people from Louisiana and Alaska.

I cannot give you answers yet, but recognize that certain areas will have to be exempted from this no net loss policy.

CONVERTED FARMLAND USE POLICY

Senator JOHNSTON. Now, we also have another problem. The city of Monroe, the city of Shreveport, my hometown, and a large part of the city of New Orleans are, in effect, located on sites of converted farmlands. If we cannot dig for footings and put subdivisions in those areas, it will really be very difficult on commerce. I hope we can work that out. I think it is very unhealthful to have our agricultural people——

Mr. PAGE. We are holding a public meeting in Baton Rouge starting tomorrow to look at implications of the delineation manual for agriculture. This morning I signed an MOA showing that rice areas can be converted to crawfish ponds without being exempt from the full program. I do not think EPA has signed it yet, but you will be getting it today, I hope.

We are looking at catfish farming which, more than likely, can be handled by a general permit. We want to define that a little better. Vicksburg District is doing that for us and we should have results by early next week. We will get them to you as soon as we have them, Mr. Chairman.

LONG-TERM SOLUTION TO LOUISIANA WETLANDS LOSS

Senator JOHNSTON. It has been suggested that the only real long-term solution to Louisiana wetlands loss is to get Mississippi River water with its silt and freshwater back into the shallow areas of the gulf, which you could do, in effect, by breaking the levee below New Orleans.

General Hatch, I know you are familiar with that proposal. I would like to ask whether you think that is practical—whether you or General Kelly think that is practical, whether it ought to be studied, and if not, what macro solutions there might be, and do you have the ability to study those at present?

General HATCH. Sir, first of all, we have one of those diversion projects actually under construction at this time, the project called Caernarvon, and two others in some stage of development or design.

In addition to that, our New Orleans District is involved in a comprehensive study of the total tidal marsh loss problem in concert with other Federal and State agencies. The selective diversion of fresh water from the Mississippi River is very clearly technically feasible and economically appropriate, and is probably going to be one of the major solutions to that problem.

CHANGING THE COURSE OF THE LOWER MISSISSIPPI RIVER

Senator JOHNSTON. Well, I am not talking about smaller projects like Caernarvon, which I think is a good project, or Davis Pond, or Bohemia, or any of those. Those are relatively small projects. I am talking about changing the course of the Mississippi River and probably putting in a navigation canal to replace the lower part of the river channel. That has been suggested. I do not give that as my suggestion, mainly because there are some negative things about that. But should it be studied and is it being studied, and, if not, why not? Do we need to do anything?

General HATCH. Sir, our studies to date have not been, if I may, that adventuresome. I believe we probably assumed, perhaps prematurely, that the environmental as well as economic issues associated with such a major diversion of the Mississippi River would render such an alternative not feasible and undoable. But, I certainly do not want to preclude our looking at that. We are not at this time going that far in our studies.

Senator JOHNSTON. Well, why not? Why should we not do that? Do you have an opinion on that, General Kelly?

General KELLY. Well, as General Hatch said, Mr. Chairman, the environmental impacts of that would be quite large. I do not know whether New Orleans District has surfaced that alternative with the State, for instance, during its discussions in putting together the Louisiana comprehensive wetlands study. But that certainly could be considered. Nevertheless, as General Hatch said, the impacts, both economic and environmental, would be quite large.

Senator JOHNSTON. It would be highly controversial, to say the least.

General KELLY. Absolutely.

Senator JOHNSTON. But there are those who tell me that—I was discussing it yesterday, as a matter of fact—you can just look at these different footprints and tell that none of this is really going to work unless you get massive amounts of water and silt into the marsh.

General KELLY. Of course, you know we are trying to hold the Mississippi where it is right now with the Old River Control Structure, and that is going to be a tough one to tackle.

Senator JOHNSTON. Well, what would it take to make a realistic study of that, to know to the closest couple of hundred million dollars what it would cost?

General HATCH. Sir, I believe we could address that question within our current authority and funding of the comprehensive study. As General Kelly said, perhaps the New Orleans District has already considered that and we are just not aware of it. But, let us use our current authority and funds at least to give a preliminary look at that alternative.

Senator JOHNSTON. I do not think there is an active, ongoing study of that, and I think there ought to be. We ought to look at it at least to the extent of determining whether we ought to ask the serious question. In other words, we should determine whether it is even in the realm of thinkability, much less feasibility.

General KELLY. Well, we have, as General Hatch said, Mr. Chairman, the authority in the Louisiana comprehensive study to address all sorts of wetlands problems. Seven agencies, and mainly the State which is a key contributor, are participating in that study, so that is probably the right one in which to take a look at it.

Senator JOHNSTON. All right, so you will take a look at that?

General HATCH. Yes, sir.

General KELLY. We will; yes, sir.

Senator JOHNSTON. When could we expect to get some preliminary finding.

General KELLY. Sir, we will have to get with General Williams and LMVD to determine this, and once we know, we will provide that information to you.

Senator JOHNSTON. Thank you very much.

[The information follows:]

Upon consultation with the Lower Mississippi Valley Division, it was ascertained that options of the type described were explored in some detail in the ongoing Mississippi River delta reconnaissance study. That study is nearing completion, and we will provide a copy of the report to the subcommittee upon completion.

ENDANGERED SALMON SPECIES IN THE PACIFIC NORTHWEST

Senator JOHNSTON. Senator Hatfield?

Senator HATFIELD. Thank you, Mr. Chairman. Mr. Secretary, Generals—gentlemen. There are a number of items that I want to raise on the matter of the budget and projects, but I shall submit those in writing.

With the indulgence of my colleagues, I would like to raise a nonbudget issue which has, in general, been dominant in the Pacific Northwest for the last 10 years in another field; namely, forestry. It has now emerged as one that involves the Corps of Engineers through a petition filed in Idaho and three more petitions possibly to be filed regarding endangered salmon species—coho in the lower

Columbia River, and the spring, summer, and fall chinook in the upper Columbia and Snake Rivers.

General, the data I have seen thus far are very preliminary, but very dramatic, and would indicate declines in the native stocks. Therefore, I have asked the Oregon Commission of Fish and Wildlife to undertake an immediate study of scientific data and have asked the National Marine Fishery Service to assure that every bit of data it has can be brought forward quickly. Following this data-gathering phase, my hope is that a needs assessment will be conducted to interpret what the data are telling about the viability of these species. Finally, if these data are validated, I envision that the region would discuss the various management alternatives which might be implemented in order to address this concern and, hopefully, avoid an actual petition under the Endangered Species Act.

Now, my question is twofold. Do you have any scientific information or data about the specific species that could be useful in this preliminary phase of scientific review, and I am speaking of the coho and three species of chinook?

The second question is, would the Corps be willing to sit down with other groups from the region—the Bureau of Reclamation, the Bonneville Power Administration, and others—to discuss what management alternatives might be implemented, assuming two things: one, that the collected data will indicate a diminution of these species; and two, that only by doing so can filing of the petition for the listing be avoided?

General HATCH. Sir, to answer your first question concerning the availability of data, I am quite confident that in the large body of data that our North Pacific Division has, there is certainly some information that would be of use. I understand that our North Pacific Division is engaged in the current review of those species.

Second, we would be very interested in partnering, if you will, to use a current buzz-word, with all agencies concerning the potential for listing and the impacts that would arise therefrom. I am confident you realize there would be potentially severe impacts on the operations of our projects and considerable economic impact.

Senator HATFIELD. General, I appreciate your response. It is what I hoped it would be.

I raise this issue because, as I say, we have been going through, and are in, a very, very critical situation as it relates to the spotted owl and the management of our forest resources. We have learned a lot of lessons from this, I hope. If the management agencies themselves do not take seriously the scientific data which is brought to their attention, we have to be mindful of the fact that a single individual, or an interest group, can petition the Federal Government to have, in effect, management authority taken away from that agency. I would venture a guess that between the courts and the National Marine Fisheries and other fisheries groups that forestry will be more under their management in the future. At least, that is the potential we face.

CORPS' NEED FOR EARLY INVOLVEMENT IN RESOLVING ENDANGERED SALMON ISSUE

Now, the Corps of Engineers is a unique organization in many of its resource activities, because—and I do not mean this negatively—it operates under rules created by Congress. You operate your facilities based on a very prescribed set of regulations, such as whether the facilities are for flood control or multipurposes, and whether serving such purposes is cost effective.

Now, when thrown into a totally different situation, as you will be in dealing with the endangered species issue, I can see that you might have trouble, in that such activity runs contrary to much of your history and discipline. But, I must be frank, I have followed these issues in the Pacific Northwest very closely, and I foresee that this issue portends to rip the heart and the soul right out of the Corps unless it becomes involved early.

The Corps needs to stand on its strengths and demonstrate some flexibility in those areas where other Federal objectives might conflict with the Corps' mission, as I see it. For example—and this is where the rubber meets the road—we need flexibility in the fish bypass program. We have known for many years that dams on the Columbia River account for one-half of the deaths of the salmon smolts coming down from the Snake River, yet the Corps and OMB have resisted our efforts to install fish bypass improvements until this year, when they budgeted $15.8 million. As a result, this administration is now facing one threatened specie petition already and possibly three more. Despite this, it has chosen not to include funding for bypass improvements at the Dalles and Ice Harbor, and, instead, wants to study the issue for a couple more years.

Now, if you were a member of an Indian tribe, or if you were a sports fisherman, you would have to wonder what good it is going to do to improve the fish migration at four dams but not at the other two. What kind of commitment, they could question, is this?

RISK OF LOSING AUTHORITY TO OPERATE COLUMBIA RIVER DAMS

As head of the Corps, you, unfortunately have to ask yourself whether it is worth insisting on looking at the world only through these budgetary glasses that we all have to wear from time to time, at the risk of having a Federal court and another agency of Government—namely the Commerce Department—take away your authority to operate your dams because they endanger a native specie of salmon. I am giving you a bad case scenario, but it is very real out there.

These are enormously complex problems. I hesitate to even simplify in this brief statement, but I must say that the stakes are very high in this game, and we are all in it together. I have made this statement to Jim Jura, the Director of the Bonneville Power Administration, and I will make it to you and others as well, because we are in this game together whether we like it or not. As Federal employees, I believe we have to show the public our stewardship of the resources. Unfortunately, because of the way this river system is managed and because of the way the legal system is today, if only one agency drops the ball, we all end up in court.

Then the courts take over the administration or policymaking of these projects.

Now, believe me, I have seen the Pacific Northwest go through too much of this over the past 10 years in the forestry area. We already have the spotted owl listing hanging over our heads, and it is difficult to deal with. I do not want to see one inflexible Federal agency or reticent Federal agency send a wrecking ball through the economy of the Northwest any more than we have already experienced.

I do not raise this in an accusatory way or to indict you but, rather, to alert you, as I am sure you may be aware already, and to emphasize the important role of being in on the beginning so that you can sustain a viable role in this process. We have had the courts take over too much of our forestry management. They are incompetent to run the forests. They are not trained to run the forests, and yet, that is the way the situation has developed. And, so, I have taken this occasion to raise this issue with you today.

General HATCH. Senator, thank you very much. General Stevens, our North Pacific Division Commander, has alerted us to this issue. We certainly agree with you and appreciate your emphasizing the need for our providing that data and assertively participating in those analyses.

Concerning the fish bypass program, we appreciate your noting that we have funded at least some of that for this year. At this time, the other two are not economically feasible. The picture that you have just painted certainly gives us reason to be concerned for a broad array of issues we must consider for the future.

ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Senator HATFIELD. Thank you, General and, Mr. Chairman, thank you for this opportunity.

Mr. Chairman, I have a number of other questions I would like to submit for the record, including questions on the statuses of the Bonneville Lock project, the Elk Creek Dam, and a new wetlands reclamation demonstration project at Newport, and I would request, sir, your full attention to these matters as well.

General HATCH. Yes, sir.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR HATFIELD

ELK CREEK DAM, OREGON

Senator HATFIELD. What is the status of the project to date?

General HATCH. Sir, on February 22, 1990, the United States District Court for the District of Oregon ordered the Corps to prepare a supplemental EIS for the Elk Creek Dam Project. The court injunction remains in effect until the Environmental Impact Statement Supplement, know for short as an EISS, is completed and the court acts on a subsequent motion to dissolve the injunction.

Senator HATFIELD. Does the Corps consider this an on-going project?

General HATCH. Sir, the Elk Creek Lake project is budgeted in our Continuing Construction, General program. It is an on-going project interrupted by the court injunction. A decision on future construction activities of the dam must await the conclusion of the NEPA process and dissolution of the injunction by the District Court.

Senator HATFIELD. What is the status of the EIS supplement? Explain its contents.

General HATCH. Although we are continuing to refine the scope and content of the EISS, it is currently underway and will be continued based on directions contained in the court order. Tentatively, it appears a Record of Decision can be completed during the summer or fall of 1991. The EISS will address the cumulative impacts of the three Corps projects within the Rogue River Basin, including Elk Creek Lake. It is anticipated that the EISS will also provide an evaluation of alternative operating scenarios with regards to irrigation demands, downstream flows, and impacts to fish and wildlife.

Senator HATFIELD. Last year you said the Record of Decision would be signed in June 1990. Is this on schedule?

General HATCH. No, sir, it is not. While action by the District Court was pending, the Corps continued to work on environmental issues related to Elk Creek so that these issues may be addressed in depth and an adequate EISS prepared. Tentatively, it appears a Record of Decision can be completed during the summer or fall of 1991, depending on EISS requirements.

Senator HATFIELD. How do you plan to use the $3 million proposed in the FY 1991 Budget?

General HATCH. Sir, these funds are programmed for project maintenance, the EISS, the Record of Decision, and engineering and design.

Senator HATFIELD. When could construction of the dam resume?

General HATCH. Sir, following the completion of the EISS and the Record of Decision, preparation of plans and specifications could be completed about a year after the Record of Decision. Review, advertisement, and award of contract would require another nine months. The contract, however, cannot be awarded until the court injunction has been lifted.

Senator HATFIELD. How do you plan to operate Elk Creek Lake?

General HATCH. Sir, we are currently reviewing several operating alternatives and evaluating these alternatives with regard to irrigation demands, downstream flows, and impacts to fish and wildlife. These operating alternatives will be included in the EISS.

Senator HATFIELD. What was the outcome of the remand order issued by Judge Burns?

General HATCH. Sir, since the EISS is not complete, the court injunction is still in effect. The court ordered the injunction to remain in effect until the EISS is completed and until such time the court acts on a subsequent motion to dissolve the injunction.

WILLOW CREEK DAM, OREGON - RECREATION FACILITIES

Senator HATFIELD. Local officials have indicated their interest in constructing several recreation site improvements and have committed to sharing in the cost of construction as well as paying for annual operation and maintenance upon completion.

Please describe the proposed improvements; provide the Corps' full FY 1991 capability; identify the range of reservoir levels which are anticipated to fully utilize these facilities and whether such levels compromise the integrity and safety of the dam.

General HATCH. Sir, I understand local officals desire construction of the proposed recreation facilities located on a flat near the left abutment of the Willow Creek dam. The Master Plan provides that improvements would include a new campground with 25-30 camping spaces, a day use picnic area, a courtesy boat dock, restrooms, a swimming beach, shoreline trails, and related utilities and appurtenant facilities. Though no detailed cost estimate has been prepared the current best estimate for the facilities described is approximately $300,000. If constructed the cost of the facilities would be split $150,000 Federal and $150,000 to be provided by the Willow Creek Park and Recreation District. As you are aware budget priorities have precluded budgeting funds to cost share new recreation facilities at completed projects, therefore, we do not have an FY 1991 capability.

Reservoir levels for Willow Creek include the normal multiple purpose pool ranging between elevations 2,063 and 2,047. Irrigation contracts with the United States Bureau of Reclamation would allow future storage up to a maximum summer target elevation of 2,076.5. None of these pool elevations would compromise the integrity and safety of the dam. Recreation facilities could be utilized at all normal operational reservoir levels.

GRAYS HARBOR, WASHINGTON

Senator HATFIELD. I am pleased to see you proceeding with this project. What is the current status of the dredging for this project?

General HATCH. Sir, work began in late April for dredging of the downstream portion of the project. Dredging of the upstream portion of the project is scheduled to begin in the second quarter of FY 1992.

Senator HATFIELD. When do you expect to have the channel available for deeper draft vessels?

General HATCH. Sir, the channel to the downstream terminals will be available for deep draft vessels in December 1990. The upstream portion will be available upon completion of the railroad bridge, scheduled for the fourth quarter of FY 1992.

Senator HATFIELD. Briefly describe the railroad bridge relocation work you have scheduled for FY 1991.

General HATCH. Sir, following completion of plans and specifications, work is scheduled to commence in the third quarter of FY 1991 on modification of the railroad bridge from a center swing-span bridge to a twin-tower vertical lift bridge, increasing the horizontal channel clearance from 125 to 250 feet. The first major item of work will be construction of new bridge piers, leading to completion of the bridge in the fourth quarter of FY 1992.

COLUMBIA RIVER CHANNEL DEEPENING, OREGON & WASHINGTON

Senator HATFIELD. Congress appropriated $700,000 in FY 90 to initiate a reconnaissance study for deepening the Columbia River channel. Why was only $580,000 made available for this study?

General HATCH. Sir, the allocation of $580,000 reflects the total estimated cost of the reconnaissance study.

Senator HATFIELD. What is the current status of that study and when will it be completed?

General HATCH. The reconnaissance study was initiated on December 1989 and is progressing on schedule. It is scheduled for completion in December 1990.

Senator HATFIELD. What are the tentative dimensions envisioned by the channel deepening proposal compared to the existing 40-foot channel?

General HATCH. Sir, two alternatives are being evaluated in the reconnaissance phase studies. They include a 45-foot deep by 600-foot wide channel for the entire authorized project length, and a 42-foot deep by 600-foot wide channel for the lower 48 miles.

Senator HATFIELD. What communities will participate as local project sponsors for the feasibility study and for the project?

General HATCH. Seven ports on the lower Columbia River have expressed an interest in sponsorship of the project as well as the feasibility phase of the study for a deeper channel. The seven ports include: Astoria, St Helens, and Portland in Oregon and Longview, Kalama, Woodland, and Vancouver in Washington. We expect the Port of Portland to be the principal sponsor.

Senator HATFIELD. How long do you expect to take to complete the feasibility report?

General HATCH. Sir, The feasibility report is scheduled to be completed within three years after initiation.

Senator HATFIELD. Is there a way to speed-up the report without sacrificing critical information?

General HATCH. No, Sir, at this time we anticipate that the number of highly-technical issues that must be addressed and resolved during the feasibility study will dictate the three year duration. However, we will consider opportunities for feasibility study acceleration at the end of the reconnaissance study, as a detailed Plan of Study is prepared.

WILLAMETTE RIVER, OREGON - WATER TEMPERATURE STUDIES

Senator HATFIELD. In 1982 the Corps initiated the Willamette System Temperature Control Study to address numerous concerns about the impact of federal hydro facilities on fish habitat in several sub-basins of that system.

As part of a new Willamette River Basin Water Use Review Study authorized in 1988, the Corps is proposing additional studies of the water temperature issue in this system. This work, we understand, will not be completed for three to four years.

In the meantime, numerous organizations including the Northwest Power Planning Council, have expressed growing concern about this matter and in the case of the Eugene Water and Electric Board, their federal FERC license for the Blue River facility is in jeopardy because water temperature data will not be available in a timely manner.

Is it possible to expedite the temperature control portion of the on going Willamette River Basin Review in order that these questions can be addressed in a more timely manner?

General HATCH. Sir, as a part of the reconnaissance phase of the Willamette Basin River Review Study, we are considering the provision of temperature control at several reservoirs in McKenzie, Santiam, and Middle Fork Willamette subbasins and determining if existing operation or storage allocation of all 13 Corps Willamette reservoirs should be changed to better meet present day needs. A reconnaissance phase report addressing these matters will be completed at the end of FY 1991. However, information serving as a basis for that report, including whether temperature control facilities are needed, effective and economically justified, will be available several months earlier. Based on these considerations, there may be limited opportunity to expedite the temperature control element of this study. That opportunity will primarily be in FY 1992.

Senator HATFIELD. Are funds included in the FY 91 to, in fact, expedite this work?

General HATCH. Sir, funds included in our Fiscal Year 1991 Budget are adequate to complete the reconnaissance report as scheduled.

Senator HATFIELD. What is the Corps' capability to accelerate this work in FY 91 and beyond, and how soon can this information be made available?

General HATCH. Sir, until the results of the on-going reconnaissance studies are known, we have insufficient basis for determining additional Fiscal Year 1991 requirements. We believe the best opportunity to expedite that study element would be in Fiscal Year 1992 when reconnaissance results are known and a non-Federal sponsor to cost share the follow-on feasibility studies has been identified.

COLUMBIA SLOUGH - JOHNSON CREEK, OREGON

Senator HATFIELD. Local officials have expressed an interest in expanding the proposed Corps' study of the Columbia Slough and Johnson Creek to include a comprehensive region-wide improvement plan, including water quality, upgraded drainage capacities, wetlands and wildlife habitat protection, in addition to general purpose flood control.

What authority would be required for the Corps to conduct such a study?

General HATCH. Sir, we could conduct a study of this scope under the existing Columbia River and Tributaries authority or a new study resolution could be developed.

Senator HATFIELD. What would be the earliest date such a study could be initiated?

General HATCH. Sir, such a study could be considered in our Fiscal Year 1992 Budget.

Senator HATFIELD. What would be an estimate of the Corps's capability for such a comprehensive study, and would cost sharing be required?

General HATCH. Sir, without the scope of such a study yet established, we are unable to present a cost estimate at this time. As for cost sharing, we would expect the normal procedures to apply. The reconnaissance phase of the study would be fully Federally funded, and the follow-on feasibility phase would be cost shared 50/50 with a non-Federal sponsor.

SALEM, OREGON - WATER FRONT

Senator HATFIELD. Inquiries were made last month regarding the Corps' capability to assist the City of Salem, Oregon with various bank stabilization activities along the Willamette River water front.

What was the outcome of those discussions?

General HATCH. Sir, a Corps representative met with the City and its planning consultant on April 4, 1990. No significant erosion of the bank slopes at the areas of concern was observed. However, settlement of portions of the street landward of one section of river bank has occurred, but it did not appear to be caused by river action. We believe the settlement is caused by either consolidation of fill material under the street or represents the start of a massive failure caused by a combination of landward drainage and weak soils and/or slip planes. Providing erosion protection on the river bank would not stop the settlement. The City was advised that no bank protection work is needed at any of the areas at this time, and that a geotechnical investigation should be made at the area of settlement. Representatives of the city's consulting firm indicated that geotechnical investigation of the problem had been made and that it was determined that the river was causing the settlement. They concluded that a riprap revetment should be constructed on the river bank to counteract the settlement. We understand the City will furnish the Corps a copy of the geotechnical report for review.

Senator HATFIELD. Is there a capability for study funds or bank stabilization in FY 1991?

General HATCH. Sir, if upon our review of the geotechnical report, we agree that the settlement is caused by the river, then we would initiate reconnaissance studies under our existing Willamette River Bank Protection Program using available funds.

NEWPORT, OREGON - WETLAND DEMONSTRATION PROJECT

Senator HATFIELD. Mr. SECRETARY and General HATCH, full implementation of new wetlands regulations has been put on hold, but there is much the Corps could be doing within existing authority to address the wetlands dilemma.

I am not as familiar as I should be with on-going activities in areas like Louisiana which has the largest share of the nation's wetlands areas, but I am familiar with a couple of new projects in my state which are attempting to prove the efficacy of reclaiming historic wetland areas, that may eventually be necessary to offset new development.

One such project is located along the central Oregon Coast near Newport, where a fifty year old highway has bisected an estuary area from its rich supply of coastal nutrients. A locally based, non profit organization has approached the Corps about utilizing this area as a demonstration area for wetlands reclamation, whereby, surplus dredge spoils would be placed on the land in order to reclaim the wetland area.

Such an idea has further merit in that it may prove valuable as a dredge disposal site, which as you are aware, is in great demand after the Mt. St. Helens eruption nearly exhausted all our disposal sites in the Northwest.

This is a relatively new initiative, but are you familiar with the proposed Newport Wetlands Demonstration Project and could you provide the Subcommittee, perhaps For the Record, a Capability Statement for studying this project? I believe that it would involve just a few thousand dollars, but could serve as a model for other such projects around the country.

General HATCH. Sir, Portland District staff recently met with the Executive Director, Oregon Coast Aquarium to explore areas of assistance for Wetlands Demonstration Project at Newport, Oregon. On the surface, it appears that a cooperative effort could be developed under existing authorities. We intend to review this matter in connection with the development of our FY 1992 Budget.

REPLACEMENT GENERATORS - COLUMBIA RIVER SYSTEM

Senator HATFIELD. During the record setting winter cold snap last year, the Corps experienced an outage of a generator at one of the hydro electric facilities on the Columbia River system.

The pending energy shortfall in the Pacific Northwest, together with the recognition that many of these Corps assets are close to the end of their useful life, raises the question about scheduled, or unscheduled for that matter, replacement of these generators.

What are the Corps' plans for replacing generators on the Columbia River system?

General HATCH. Sir, we replace individual generators when continued routine maintenance is not economically justified or when repair is not feasible. At this time, we do not anticipate the need for the wholesale replacement of its generators on any other basis.

Senator HATFIELD. Are replacement generators acquired in advance in order that they are available in the time of peak demand?

General HATCH. No, sir. Complete replacement generators are not available in advance. However, some parts are available at all Corps projects to effect minor and expeditious repairs in the event of generator failure.

Senator HATFIELD. Recognizing the budgetary impact of an ambitious replacement program compared to other O&M requirements in the Corps, has the Corps studied the feasibility of an emergency reserve generator acquisition program?

General HATCH. No, sir. The Corps has not specifically studied the feasibility of an emergency reserve generator acquisition program.

COLUMBIA RIVER TREATY FISHING ACCESS SITES

Senator HATFIELD. I note this is a new PED study in FY 1991, two years after enactment of the legislation. What are the budgeted funds to be used for?

General HATCH. Sir, the project was authorized without pre-authorization studies. It provided authorization but no funding to undertake actions in support of treaty fishing. FY 1991 funding will be used to initiate a two year PED study. During the first year, implementable plans will be developed for full implementation. Site plans and cost estimates will be prepared for the 21 identified sites, or alternatives; sites to be acquired on Bonneville Pool will be identified; and plans and cost estimates for improvement of the existing in-lieu sites will be prepared. In addition, our agency will begin negotiation of a Memorandum of Agreement with the Department of the Interior and the treaty tribes to address implementation issues.

Senator HATFIELD. What areas are without controversy and can proceed with acquisition and construction at this time?

General HATCH. Sir, we are not in a position to proceed with land acquisition for facility construction at this time. As noted above, lands with potential for acquisition will be identified during FY 1991. Subject to funding in FY 1992, mapping, tract descriptions and appraisals would be prepared. Land acquisition could be initiated in FY 1993. Implementable plans for the development will also be prepared during FY 1991. Subject to funding in FY 1992, construction contract plans and specifications will be prepared for those sites which are suitable for early development. The project will be available for a construction start in Fiscal Year 1993. Based on limited existing data, the sites which appear to be candidates for construction in FY 1993 include the Bonneville Area Office Site, in Skamania County Washington, the Celilo Site, in Wasco County Oregon, and the North Shore, Alderdale and Alder Creek Sites, all located in Klickitat County, Washington. In addition, restoration work at Cascade Locks, Lone Pine and Underwood In-Lieu sites, appears to be a candidate for FY 1993 action.

Senator HATFIELD. When do you expect to resolve conflicts with the other areas, and will clarifying legislation be required?

General HATCH. Sir, as a part of the PED study, the Portland District will complete an evaluation report by the end of FY 1991. The report will recommended solutions to all legislative requirements, including those requirements at controversial sites. The recommended solutions may require clarifying legislation, as boundary adjustments or alternative sites may be recommended.

Senator HATFIELD. What are you doing as interim measures for this work in FY 1990?

General HATCH. Sir, under our Operations and Maintenance program for the Columbia River Projects, we have conducted monthly meetings with Bureau of Indian Affairs and the task force representing the four treaty tribes, to develop an interim management cooperative agreement for Federal lands impacted by the law. Accomplishment of this task is complicated by the interest of the treaty tribes to encourage land acquisition and site development on an expedited bases. Their interest is to expedite development of a showcase site, or sites, to demonstrate good faith to both tribal fishers and the general public. Insofar as the interim management is concerned, it appears the treaty tribes will only agree to joint use of the designated sites on a year by year basis.

Senator HATFIELD. How are you coordinating your efforts with both the Indian and non-Indian users?

General HATCH. Sir, in addition to conducting monthly coordination meetings with the Bureau of Indian Affairs and the task force representing the four treaty tribes, we have offered to brief the tribal councils on the status of our program. To date we have conducted one such briefing, for the Tribal Council of the Warm Springs Reservation of Oregon. We have recently issued a public mailer to all interested agencies, organizations, and publics, which summarizes the status of our program and our legal and policy interpretations pertaining to implementation of the law. We have also conducted coordination meetings with state and local agencies who are lessees of Federal lands impacted by the law.

Senator HATFIELD. Are you holding public meetings on this work?

General HATCH. Yes, Sir. In August of 1989, we conducted a series of six public information meetings. The Tribal Task Force and the Bureau of Indian Affairs participated in these meetings. Additional public meetings will be conducted as necessary, to advise the public of our progress toward implementation.

WILLOW CREEK DAM, OREGON - DAM SAFETY ASSESSMENT

Senator HATFIELD. What were the final conclusions of the special Willow Creek dam safety assessment?

General HATCH. Sir, the basic conclusion was that the dam is safe and will remain so in the future as it performs its designed flood control function. I will furnish the specific conclusions for the record.

(The information follows:)

a. The dam is a safe structure, and it should remain fully capable of safely fulfilling its intended function in the future.

b. From concrete testing, there is no evidence of corrosion of the roller compacted concrete, abbreviated as RCC, along the lift joints or at the upstream face.

c. Data from the water quality testing suggests dissolution of materials within the roller compacted concrete. However, physical examination of RCC does not indicate deterioration of RCC.

d. The net effect of dissolution and re-deposit of minerals is not considered a negative process. In fact, it is believed responsible for the decrease in seepages since 1984.

Senator HATFIELD. What did the study conclude were the sources of the leaching materials and what were found to be the impacts of those materials on the structure?

General HATCH. Sir, the primary source of the leaching materials is calcium hydroxide, one of the by-products resulting from the hydration of Portland cement. The calcium hydroxide does not provide significant strength to the concrete; however, the calcium hydroxide is relatively water soluble and can easily leach as water passes through the concrete. From physical testing of the RCC, no negative impact from the leaching of these materials was found. The leaching of calcium hydroxide along with the subsequent recombination with atmospheric CO-2 to form calcium carbonate within the RCC is believed responsible for the reduced seepage rates at the dam.

Senator HATFIELD. Approximately how many tons of material are being immobilized within the dam and is the material being dissolved in a uniform manner across the structure?

General HATCH. Sir, the net rate of dissolution is estimated at 10 to 13 metric tons annually. Dissolution of materials is directly proportional to seepage characteristics, where most seepage occurs along RCC lift surfaces.

Senator HATFIELD. Core samples were taken from the dam, including the right abutment upstream face of the dam. Were those samples evaluated by the contractor or by the Corps? What were the findings?

General HATCH. Sir, core samples taken from the right abutment upstream face were tested and/or evaluated by three different Corps organizations. I will submit the conclusions for the record.

(The information follows:)

1. The Corps of Engineers, South Atlantic Division Materials Laboratory performed a petrographic analysis of the RCC. Results are:

a. There is no evidence of "abnormal" differing mineralogical characteristics between interior and joint surface cement paste.

b. There is no evidence of deterioration of chemical attack in any of the samples.

c. Alteration of normal cement constituents along joint surfaces providing a higher quality of the carbonate minerals (calcite and vaterite in samples 3, 4, and 6) was noted, however, this was not considered unusual or harmful.

2. The North Pacific Division Materials Laboratory performed strength testing of the RCC. Results are:

a. Evaluation of concrete strength data is within the range of test data variation and is interpreted to indicate there is no deterioration of RCC exposed to seepage waters.

b. Quality of RCC below the thermocline, deep reservoir waters, is higher than quality of RCC above the thermocline.

c. Bi-axial shear strength tests confirm that RCC properties affecting the structural stability of Willow Creek Dam have not changed, worsened, since construction, and are not lower than those values used during design.

3. Portland District performed evaluation of the strength test by visual evaluation of the RCC cores, including examination of borehole photography and videotapes. Results are:

a. Quality of RCC below the thermocline where seepage has occurred and water quality is less, approximate elevation 2,043, is better than above the thermocline. The presence of calcite along lift joints indicates that detrimental dissolution is not occurring, since it is not likely to have precipitation of calcite at the same time and location where calcium based concrete minerals are being dissolved.

b. There is not visual evidence of dissolution or deterioration along lift joints below the thermocline.

WILLOW CREEK DAM OREGON - SEEPAGE

Senator HATFIELD. The study implies that seepage on the face of the structure is decreasing and would stop over time because leaching materials would redeposit themselves filling the voids in the concrete. How does one confirm that these deposits will remain permanently or whether instead they might further dissolve over time? Does the study confirm that seepage is decreasing on the face of the dam, and from within the gallery, as well?

General HATCH. Sir, there is no evidence to indicate that there is any dissolving of the existing calcium carbonate deposits. As long as seepage rates remain the same or show a decreasing trend with time, which has been the case since 1984, there likely will be no significant dissolution of calcium carbonate. There is no way to assure that these deposits will never start to redissolve. However, if this were to occur, it would occur very gradually over many years. In consideration of this possibility, we have a long term monitoring program designed to analyze trends, including long term seepage rate reversals. If such a long term seepage trend reversal was detected there would be sufficient time to analyze, design and take corrective actions before seepage increases become a serious concern. This study confirms that there is a trend of decreasing seepage both on the face of the dam, and from within the gallery.

Senator HATFIELD. Is the behavior of leaching materials used in this study determined through empirical evaluation or through modeling techniques?

General HATCH. Sir, the behavior of leaching materials has been determined both through emperical evaluation and through modeling techniques. The leaching values of 10 to 13 metric tons are based on actual quantitative and qualitative analysis of solids exiting the dam; whereas, the estimate of 100 metric tons of materials being redistributed within the dam result from a model study only, in which the assumptions going into that model are questionable.

Senator HATFIELD. What follow-up studies are being implemented to both confirm the findings of this initial report and monitor the structure for changes in its condition? Will water quality studies be conducted of the reservoir? Will further core samples be taken on a routine basis? Will further modeling be conducted concurrent with empiric evaluations? Will on-going evaluations attempt to identify the volume, sources and migration of material on the face and in the gallery? Or will the monitoring program be limited to structural engineering surveys and analysis only?

General HATCH. Sir, follow-up studies that are being implemented in addition to the normal dam safety monitoring program for Willow Creek Dam, include: evaluation of specific reservoir and seepage water characteristics, weir flow measurements within the gallery and at the spillway, total dissolved solids from selected seepage collection locations, the "Langelier Index" from selected reservoir and seepage locations, and changes in percent of seepage water constituent chemicals.

Studies of reservoir water and seepage waters will continue indefinitely to detect, analyze, and evaluate any changes that might occur. It is not planned to take cores on a routine basis; however, cores taken as part of the recent investigations are being stored at the North Pacific Division Materials Laboratory so that comparison can be made if additional cores are taken in the future. No further modeling is scheduled. Our long term evaluation plan for the Willow Creek Dam includes primarily the continuation of qualitative and quantitative analysis of reservoir and seepage waters. An analysis of sources and migration of material on the face and in the gallery are part of the studies.

Senator HATFIELD. At one point during the study certain data was disallowed as "transient" data because it was skewed by higher than normal water levels in the reservoir. What were those water levels that caused the "transient" data? How do those levels compare to historic levels since the study, and levels planned for future operation of the dam?

General HATCH. Sir, The water levels that caused the "transient" data occurred during the summer of 1988. The reservoir water elevation that resulted in this transient data was 2076 and is 13-feet higher than at any time prior to or following this event ,normal operating pool is 2063. In the future, it is possible that the pool could be raised again to elevation 2076. If this does occur, it is expected that seepage waters exiting the dam above 2063 will eventually assume the same chemical characteristics as seepage water below 2063.

COMMERCIAL ACTIVITIES STUDY OF POWERHOUSES IN WILLAMETTE RIVER PROJECTS, OREGON

Senator HATFIELD. I understand you have initiated a study of private contracting for powerhouse, dam, and resource maintenance of Mid and Upper Willamette River Projects. Please describe this study and provide me with the current status.

General HATCH. Sir, the Commercial Activities (CA) process begins by developing a performance wotk statement. This forms the basis of a management study which, in turn, describes the most efficient organization (MEO) to accomplish the function being studied. The duties included in the performance work statement become the specifications for a commercial solicitation and, thus, are the basis for both the in-house MEO bid and contractor bids. To be awarded the contract, the lowest commercial bid must be at least ten percent lower than the personnel costs included in the Government's bid. The Corps record over the last four years has been to win slightly less than half of all the CAs evaluated. As you can see, performing the CA study does not, in itself, mean automatic privatization of Corps functions.

The Portland District currently is performing a CA study on hydroelectric and flood control project maintenance for its Upper and Mid-Willamette Valley projects. This includes the Lookout Point, Dexter, Hills Creek, Green Peter, Foster, Detroit, Big Cliff and Cougar hydroelectric projects, as well as six flood control projects. The study process has reached the point where the MEO has been defined and work duties are being developed. It is anticipated that the bids for the proposed contract will be opened August 31, 1990. All contractible functions and positions at all our projects in the Upper and Mid-Willamette Valley are scheduled to be studied before the end of 1990.

Senator HATFIELD. Under what statutory authority is such a study being conducted?

General HATCH. Sir, this agency, like others, is under a mandate by the Office of Management and Budget, Circular A-76, to study all positions considered commercial in nature. The process is intended to ensure that the Federal Government is relying on the private sector to perform work, exclusive of that deemed a governmental function, when it is effective and efficient to do so. This policy was reaffirmed in Executive Order 12615, which directs each agency to study contractible positions at the rate of 3% of its civilian workforce per year.

Senator HATFIELD. How many powerhouse and other maintenance people do you expect this study to affect?

General HATCH. There are 82 positions in the functions covered by the study.

Senator HATFIELD. What will be the expected net reduction in staff and dollars as a result of private contracting? What savings will this accrue as a percentage of the total annual O&M requirements for these facilities?

General HATCH. Other cost comparisons conducted by the Corps have generated approximately a 30% savings in personnel and dollars to operate a function. We have at this time no reason to suspect that this function would yield greater or lesser savings than the Corps average. Based on this, the net cost savings that could result is estimated to be about 3 percent of the total O&M requirements for these facilities.

Senator HATFIELD. When do you expect to complete the study?

General HATCH. Sir, the current schedule for bid opening is 31 August 1990. If we do not receive appeals or protests, the final decision could be implemented by 31 December 1990.

Senator HATFIELD. Will this study be independently reviewed or made available for public comment?

General HATCH. Sir, when bids are opened, the results will be available to the public so that potential contractors who wish to may review the documentation and submit appeals or protests. In addition, the study will be independently reviewed by Government audit and the outcome will be made public. However, OMB Circular A-76 does not allow public comment as a means of influencing the decision whether or not to contract out the activity.

Senator HATFIELD. Why was the Portland District selected for this study, when efficiency of these plant operations already is at 99 percent?

General HATCH. Sir, the Portland District was not singled out for CA studies. All districts in the Corps have CA studies scheduled in proportion to their staffing sizes. The efficiency of plant operations is not known. I believe the question refers to the availability of generators for service, which is 99 percent and is not directly related to operational efficiency.

Senator HATFIELD. Private contracting at other Corps and public facilities in the Northwest has not demonstrated cost savings and instead has resulted in cost increases. Will these experiences be taken into account during the study?

General HATCH. Sir, as discussed above, the cost of performing the work by contract must be more than 10 percent less than the personnel costs of doing the work with Government forces before the contractor can win the bid. In general, the Corps has not had the experience you described in its CA program, but rather has been able not only to reduce costs by contracting out some activities, but also to become more efficient in the way we conduct work retained in-house.

Senator HATFIELD. Recognizing the importance of dam safety and facility integrity, does it really make sense to consider contracting out dams that are well into their useful life?

General HATCH. Sir, the Corps of Engineers has supervised billions of dollars worth of contracting, and safety and facility integrity are Corps hallmarks.

OREGON COSTAL PORTS - GENERAL

Senator HATFIELD. Are there other Oregon costal ports where you have a capability to perform additional work in FY 1991? If so, where and how much is your capability?

General HATCH. Sir, the proposed budget is adequate to provide anticipated maintenance dredging of all Oregon coastal projects. With our ability to reprogram funds from one project to another we intend to maintain adequately all of our costal projects.

Senator HATFIELD. Please provide a historical list: by project; by calendar year; by depth of dredging; by days of operation; and by total dollars for dredging at each coastal project.

General HATCH. Sir, I will supply that for the record.

(The information follows:)

Project Fiscal Year	Dredge (Govt. or Contractor)	Project Depth	Dredging Days	Dredging Cost ($1,000)
***********	************	*******	********	********
Chetco				
85	Govt. 1/	14	15	264
86	Govt.	14	18	370
87	Govt.	14	5	110
88	Govt. 1/	14	45	583
89	Govt. 1/	14	6	18
	Cont.	14	3	87
Coos Bay				
85	Govt.	45/35	22	430
	Cont.	45/35	47	2,976
86	Govt.	45/35	53	1,068
	Cont.	45/35	57	1,668
87	Govt.	45/35	51	1,514
	Cont.	45/35	18	705
88	Govt.	45/35	63	1,666
	Cont.	45/35	68	1,937
89	Govt.	45/35	41	953
	Cont.	45/35	24	600
Coquille				
85	Govt.	13	4	74
86	Govt.	13	12	241
87	Govt.	13	6	137
88	Govt.	13	5	110
89	Govt.	13	2	48
Depoe Bay				
87	Cont.	8	3	10
89	Cont.	8	6	73
Port Orford				
85	Govt.	16	63	195
	Cont.	16	3	53
86	Govt.	16	30	106
	Cont.	16	4	37
87	Govt.	16	52	182
	Cont.	16	N/A	50
88	Govt.	16	30	90
	Cont.	16	N/A	46
89	Govt.	16	38	114
	Cont.	16	N/A	36
Rogue				
85	Govt. 1/	13	29	263
86	Govt. 1/	13	51	181
87	Govt. 1/	13	73	363
88	Govt. 1/	13	81	270
89	Cont.	13	19	301

Project Fiscal Year	Dredge (Govt. or Contractor)	Project Depth	Dredging Days	Dredging Cost ($1,000)
Siuslaw				
85	Govt.	18	23	435
	Cont.	18	7	103
86	Govt.	18	23	467
87	Govt.	18	19	439
88	Govt.	18	9	210
89	Govt.	18	8	176
Umpqua River				
85	Govt.	26/22	20	378
86	Govt.	26/22	29	585
87	Govt.	26/22	38	896
88	Govt.	26/22	23	563
89	Govt.	26/22	13	304
Yaquina Bay				
85	Cont.	40/30	14	555
86	Govt. 1/	40/30	9	99
	Cont.	40/30	21	208
87	Govt.	40/30	36	843
	Cont.	40/30	34	413
88	Govt.	40/30	21	498
	Cont.	40/30	12	260
89	Govt.	40/30	10	225
	Cont.	40/30	12	321

1/ Includes Dredge SANDWICK

ROGUE RIVER & GOLD BEACH, OREGON

Senator HATFIELD. What is the physical status of earlier pile dike improvements at Gold Beach?

General HATCH. Sir, the pile dike improvements at Gold Beach consist of three parallel dikes constructed to reduce the south jetty shoal movement into the boat basin entrance. The inner two dikes were repaired last year. The outermost dike has failed twice, and we are continuing monitoring to see if the remaining two are sufficiently effective to allow discontinuing maintenance of the outer dike.

Senator HATFIELD. What is the status of Section 107 study for relocating the entrance to the boat basin on the Rogue River at Gold Beach?

GENERAL HATCH. Sir, this study is in the reconnaissance phase. One alignment was initially investigated which yielded a Federal interest in continuing the reconnaissance phase. During the final reconnaissance phase other alignments will be investigated to determine the recommended plan for further studies.

Senator HATFIELD. When do you expect to have the reconnaissance report complete?

General HATCH. Sir, the reconnaissance phase of study will be completed in February of 1991.

CHETCO RIVER, OREGON

Senator HATFIELD. I note you only have $6,000 budgeted for the Chetco project. How do you plan to accomplish the normal annual dredging for this project in FY 1991? From what source do you plan to take the funds necessary to accomplish this? Do you have a capability for this work, and if so, how much is it?

General HATCH. Sir, actual shoaling conditions will dictate the exact amount of dredge time and funds that will be required. Funds will be reprogrammed to the Chetco project, if needed, to perform maintenance dredging in FY 1991. As to the source of funds, we anticipate that normal savings and slippage on other budgeted work will generate the necessary funding resources. At this time we cannot identify any particular source.

TILLAMOOK NORTH JETTY, OREGON

Senator HATFIELD. When was the breach first noticed and what specifically caused the damage?

General HATCH. Sir, 1973 was the first year with recorded damage based upon aerial photo surveillance. Since no specific storm event caused the damage,we attribute it to long term wave action.

Senator HATFIELD. What is the status of design for repair of the north jetty and when would you expect to have it completed?

General HATCH. Sir, the Reconnaissance Report is now complete and we are moving into design. The General Design Memo should be completed by December 1990. Plans and Specifications would be ready near the end of FY 1991.

Senator HATFIELD. Are you proposing only to repair the jetty or is an extension contemplated?

General HATCH. Sir, we intend to place a 100-foot cap seaward from the existing end of the north jetty. Repair to full length will remain as a future option.

Senator HATFIELD. How much do you now estimate it will cost to make these repairs/extensions?

General HATCH. Sir, we estimate a cost of $4,300,000 to bring the shore end to grade, up to the major damage zone and rebuild 100 feet of major damage zone with cap stone.

Senator HATFIELD. When would you be ready to go to construction for this work?

General HATCH. Sir, construction will be considered in our FY 1992 Budget.

CONTRACT FOR THE DREDGE OREGON

Senator HATFIELD. What is the status of contract renewal with the Port of Portland for use of the dredge "Oregon"?

General HATCH. Sir, the contract is under review by my staff.

Senator HATFIELD. If contract renewal has not been completed what current or anticipated impediments might prevent such a renegotiation?

General HATCH. Sir, we are unaware of any impediments which might prevent a renegotiation of our contract work with the Port of Portland.

Senator HATFIELD. What have been the comparative costs to contract for this dredge compared to Corps' or other private dredges?

General HATCH. Sir, over the last several years, our contract costs for the Dredge OREGON have averaged about $1.10 per cubic yard. Whereas the cost for an industry dredge have averaged about $1.50 per cubic yard.

Senator HATFIELD. What has been this historical level of usage by the Corps of this dredge for Corps' related work over the past five years, in days and in dollar expenditures?

General HATCH. Sir, over the last five years, we have used the Dredge OREGON for about 90 days a year at a cost of about $3.4 million per year.

Senator HATFIELD. What is the maximum length of contract renewal for which the Corps' could obligate itself?

General HATCH. Sir, since funds are only appropriated for this project on a yearly basis, we can obligate the Corps of Engineers for only one year at a time.

JUVENILE FISH BYPASS, COLUMBIA AND SNAKE RIVERS

Senator HATFIELD. For the record, please provide a table and status report on the actual expenditures of $28.2 million of new budget authority which was included in the appropriations bills in FY 88, 89 and 90 for juvenile fish bypass on the Columbia/Snake river systems.

General HATCH. Sir, I will furnish that for the record.

(The information follows:)

Juvenile Fish Bypass Program Expenditures
In Thousands of Dollars

PROJECT	FY 88	FY 89	Thru 31 Mar FY 90	REMAINING	TOTAL
Lower Granite	$19.4	$ 3,781.8	$ 772.2	$3,524.6	$ 8,098.0
Little Goose	.0	6,391.1	4,003.7	1,668.2	12,063.0
Lower Monumental	.0	363.1	462.4	1,414.5	2,240.0
Ice Harbor	.0	248.5	137.5	404.0	790.0
McNary	18.8	1,022.2	485.4	1,273.6	2,800.0
The Dalles	.0	488.4	528.5	1,193.1	2,210.0
Total	$38.2	$12,295.1	$6,389.7	$9,478.0	$28,201.0

Senator HATFIELD. What is the status of new loading and holding facilities at Little Goose Dam?

General HATCH. Sir, the new loading and holding facilities at Little Goose Dam were operational by April 1, 1990, before the juvenile salmon and steelhead began migrating past the project.

Senator HATFIELD. What is the status of the effort to obtain waivers for permanent gate raise modifications at the projects?

General HATCH. Sir, waivers for permanent gate raise modifications have been obtained for Lower Granite and Little Goose Dams. Alternate gate-raise tests necessary before waivers can be obtained are scheduled at McNary, Ice Harbor and at Lower Monumental over the next several months.

Senator HATFIELD. What is the status of new fish transportation barges which were funded in the past? Please describe briefly problems with the contractor and any construction work which remains to be completed. Have barges been available for the fish migration this April?

General HATCH. Sir, the new fish transportation barges are completed and are now in use transporting juvenile fish from our projects. The contractor for the barge construction fell far behind schedule. The Government terminated the contract in February 1990, and the barges were moved to Lower Granite Dam where some finish work was carried out by the Corps. By April 11, 1990, the first barge was hauling juvenile fish and by 15 April the second barge was ready to haul fish.

Senator HATFIELD. Please describe activities which will be undertaken in FY 1991 with the $8.7 million requested for a new bypass system at Lower Monumental. When is completion expected and how much is needed in the outyears?

General HATCH. Sir, of the $8.7 million requested for Lower Monumental Dam in FY 1991, $3 million will be used to construct traveling screens, $3.2 million will be used to mine and construct the collection/bypass facilities, $800 thousand will be used for the holding/loading facilities, $1 million for Engineering/Design, and $700 thousand for management. The bypass is scheduled to be completed by September 1995. The funding requirements in the outyears is $23.4 million.

Senator HATFIELD. Without any budget constraints, how much can be used in FY 1991 to continue work on new bypass facilities at Ice Harbor Dam?

General HATCH. Sir, without budget constraints we could use $2.5 million in FY 1991 to continue work on new bypass facilities at Ice Harbor Dam. However, as evidenced by the mitigation analysis proposed in the FY 1991 budget, we do not know whether bypass facilities at Ice Harbor represent the best technical and cost effective solution to restoring fish runs.

Senator HATFIELD. Please explain what progress has been made on developing extended length screens.

General HATCH. Sir, the construction contract for the prototype extended length screens was let on May 9, 1990. These test screens will be ready for field testing at McNary Dam in April 1991.

Senator HATFIELD. Please provide an update on the design, testing, and installation of fish bypass facilities at The Dalles dam. Without budget constraints, how much could be used in FY 1991 to continue activities begun in prior years?

General HATCH. Sir, at present we are working on the General Design Memorandum, designing the prototype extended length screens, and carrying out hydraulic model studies at our Waterways Experiment Station. Without budget constraints, we could use $3.0 million in FY 1991 to continue work on new bypass facilities at The Dalles Dam. Once again, however, we do not know whether bypass facilities at The Dalles represent the best technical and cost effective solution to restoring fish runs.

Senator HATFIELD. Provide an explanation of the purpose an scope of the mitigation analysis which is proposed in the FY 1991 budget. Please include a detailed work plan for this effort.

General HATCH. Sir, the purpose of the Columbia River Juvenile Fish Mitigation Analysis is to determine if there is an unmet fish mitigation requirement of the Corps' eight mainstem Columbia and Snake River dams and to prepare a justified mitigation plan to address any unmet requirement. In this effort, the most cost effective measures to meet the mitigation requirement would be identified. We plan to consider not only budget outlays, but also foregone benefits associated with any alternative. Formal study scoping and preparation of a detailed work plan for this effort would begin, in coordination with the regional water and resource management entities, in October 1990.

BONNEVILLE NAVIGATION LOCK, OR & WA

Senator HATFIELD: When was the construction contract awarded and how did it compare to the Corps' private estimates?

General HATCH: The contract for construction of the lock was awarded on February 26, 1990, to Kiewit/Al Johnson, a joint venture, for $140,234,957.00. The government estimate was $137,859,826.75 and the program amount was $151,224,000.

Senator HATFIELD: What is the current status of construction at the new lock site?

General HATCH: The major contracts for the diaphragm walls and the replacement of the fish hatchery wells are proceeding on schedule. The main lock contractor, Kiewit/Al Johnson, a joint venture, has mobilized his staff and is beginning on-site construction activities.

Senator HATFIELD: How is the main lock contractor performing?

General HATCH: A preconstruction meeting was held with Kiewit/Al Johnson personnel in which goals were formalized, and all parties anticipate a successful project.

Senator HATFIELD: Has the parking situation for contract workers at the lock been resolved?

General HATCH: Yes. The contractor has established an off-site parking area and will bus his employees to and from the work site.

Senator HATFIELD: When do you expect to have the new lock available for use?

General HATCH: The contract requires that the lock be open to traffic by March 15, 1993.

Senator HATFIELD: Your justification indicates a $91 million cost increase, with $80.8 million for post contract award and other estimating adjustments. Briefly explain what these increases are for. Do they include work on the guide wall for which some movement has been noticed?

General HATCH: The increases are the result of a more detailed estimate of remaining requirements, more detailed design, differing site conditions, revised design criteria, and scope changes. This increase was reflected in the baseline cost estimate. The temporary fix on the existing guide wall is not included in the estimate since it is being funded by operations and maintenance funds of the Bonneville Lock and Dam Project of which it is a part. However, removal of the guide wall to provide for upstream clearances for the new lock is included and funded under the recently awarded contract for lock construction.

Senator HATFIELD: Do you expect any further significant cost increases for this project?

General HATCH: No, Sir we do not expect any further significant cost increases on this project.

Senator HATFIELD: How much surplus spoil material will be made available to mid-Columbia River ports pursuant to MOU's required by legislation last year?

General HATCH: The Ports of Klickitat and Skamania will receive 700,000 and 30,000 cubic yards respectively of the excavated materials in accordance with agreements between the Ports and the Corps.

Senator HATFIELD: How much surplus spoil material might be made available to mid-Columbia River ports pursuant to separate agreements with the construction contractors?

General HATCH: Kiewit/AL Johnson has indicated that in excess of one million cubic yards will be delivered to the Port of Cascade Locks under a separate agreement. An additional one million yards is available to the ports, those mentioned in the legislation, by separate agreement with the contractor.

COMPLIANCE WITH CONGRESSIONAL DIRECTIONS

Senator JOHNSTON. Senator McClure.

Senator MCCLURE. Thank you very much, Mr. Chairman, and thank you, Senator Hatfield. I want to pick up on your last note.

As I understand our discussions of the last several years, Mr. Secretary, with respect to the fish passage facilities, we have put the past behind us. I happily note the support here for the funding of the projects—those that you have supported. I understand from our conversations that if Congress disagrees with the Corps' budget request this year, and provides additional funding for the other two dams, you are prepared to execute whatever Congress directs you to do.

Mr. PAGE. Correct.

Senator MCCLURE. We are not any longer in a mode of saying, hey, we did not suggest it and we do not think we are going to do it.

Mr. PAGE. Yes, sir.

Senator MCCLURE. Am I not correct?

Mr. PAGE. You are correct.

Senator MCCLURE. And I really thank you for that because I think that is substantial progress.

WATER NEEDED FOR COLULMBIA RIVER FISH FLUSHING

I will share with you that I am not sure whether we or you have been right or wrong. Recent statements with respect to the availability of water to accomplish the fish flush are really sobering. However, we have studied this long enough; we have got to do something. Even if it is wrong, we are going to do it. That is where I have been coming from. That situation is critical. What has happened in that area in my lifetime and the lifetime of my parents with those fish runs is staggering. My mother told me stories of farmers around there standing in the inlet of Payette Lake in the fall and scooping the red fish out of the water with scoop shovels and pitchforks and loading and salting them down for the winter. Contrast that with the fact that your fish counting facilities last year counted two fish. Two fish.

Now, that is not the end of the run, but it is pretty close to the end of the run, and that has happened in a very short period of time. Because of that, there are some of us who are saying, well, maybe there are some other things that we ought to look at on a little more urgent basis. I refer, of course, to providing more water for fish flushing.

I think your people, along with a lot of others, have looked at the survivability of the downstream migrants if, indeed, we can provide the water. Now, you pointed out, in a public statement very recently, the difficulty of providing enough water to provide the same degree of current and large impoundments as existed in the old channels there before impoundments were made. There is a dramatic difference and a dramatic problem.

VIABILITY OF GALLOWAY DAM PROPOSAL IN LIGHT OF NEED FOR FISH FLUSHING

But, then, I look at things like the Galloway Dam proposal on the Weiser River. The Corps of Engineers looked at it and said, "We do not think there is a local sponsor and are not sure whether the water would really amount to very much." I have forgotten exactly what all of the comments were, but it really boiled down to we are not sure how much this project is worth. And then I question what is going to happen if, indeed, you are required to furnish, from the existing impoundments, the same amount of water the Galloway Dam might have provided.

There are real economic consequences to that alternative and I do not think that these have been arrayed against the cost of providing additional storage. As I read the analysis of Galloway Dam, for example, we are doing a kind of business-as-usual analysis of benefit/cost ratios without really looking at what is going to happen if somebody says, "Hey, we do not care how you feel about it, you are going to provide the water, and you are going to release it from existing impoundments."

I know the people at Dworshak Dam on the Clearwater River are scared to death that that is going to happen, as well I think they might be. I know that people in the State of Montana are not at all happy with the idea that they may be required to provide water from Libby Reservoir for the fish flush as a substitute for the water out of the Snake River, and I do not think anybody has analyzed how well those two fit together. I am just suggesting that maybe we are approaching the time when we will look at additional water storage for fish flushing in the same way that the Congress has reacted to fish passage facilities: Do not tell me anymore what it is going to cost, just get it done because we have made up our mind that, indeed, whatever the cost is, it has got to be done.

And I say, just on the heels of what Senator Hatfield said, when you begin to look at listings of endangered species of the entire river system, along with the Endangered Species Act as we are forced to look at it, economic consequences cannot be considered in any effective way. If cost is not a consideration, or its control is not an objective, it can be horrendous. Maybe we had better get ahead of that curve by looking at the ways in which we might provide additional water without incurring the economic cost through changed operation of the existing facilities.

Do you have any comment, Mr. Secretary?

Mr. PAGE. Well, what you are saying, of course, makes a tremendous amount of sense. We always want to try, particularly in cases we see a problem, to proact rather than react. I am sure that the General here can come up with specifics of how we might approach this better than I, but there is no way that I can challenge your rationale. I think it is correct.

EVALUATING PROJECT BENEFITS

Senator MCCLURE. Well, you operate under the rules that we give you, as well as those that are established by the administration in the administrative process, and I understand that full well. So, when I am pointing a finger at you and asking a question, I am reminded there are three fingers pointing at me in that process. We need to be involved in that, too.

But I am really very, very much concerned that the old method that we have used, that is time tested and has served us well, is no longer sufficient to guide us in the judgments that we are now faced with making.

Mr. PAGE. You are referring to the benefit/cost ratio there.

Senator MCCLURE. Yes.

Mr. PAGE. Yes; well, as we have brought the partner into this as a very active participant with cost sharing, this somehow changes the emphasis placed on the benefit/cost ratio that the Corps comes up with. The benefit/cost ratio does not take into account the wave effects that come into the community.

Senator MCCLURE. I look at some other consequences which are not at all within the parameters of a benefit/cost ratio. Let us assume, for a moment, you are forced by some action to release waters for fish flush that otherwise could be used for irrigation, for power production, or for transportation. The water then is not available for those purposes. You would begin to cause really significant economic consequences, with the loss of irrigation benefits. You would begin to lose the benefits of power production and, all of a sudden, Bonneville Power Administration would become a deficit operation.

And somebody here in the Congress—and I can name one or two who are ready to do it—would say, "Hey, you are not paying back to the Treasury what you are supposed to be paying back." And all of a sudden power rates would rise. Power rates, let us say, would double. And then what happens to the economy of the northwestern United States?

Let us look at what happens to barge traffic up and down that river system that has become such an important part of the transportation of agricultural commodities to markets in the Far East and the Pacific basin. Those are real economic consequences and yet they are never measured in the benefit/cost ratio of a new proposal.

NEED TO TRADEOFF ECONOMIC BENEFITS FOR OTHER BENEFITS

I look at Galloway Dam, and it has got a 2.3:1 benefit/cost ratio, even by current standards. Yet, we cannot find the money to provide for relocation of the railroad necessary to maintain transportation to a segment of the Weiser River basin that, otherwise, would be unserved by railroad. The railroad would just about double the cost of the project.

Well, my simple mind and mathematics say that, given a 2.3:1 ratio, double the cost and you get a 1.15:1 ratio. Is there something wrong with my mathematics?

Mr. PAGE. No; I think the first one, though, is a pretty good benefit/cost ratio—2.3.

Senator MCCLURE. It seems to me, then, that you do not look at that cost of the relocation of the railroad in quite the same way. We could do it without further damaging the economy in a very, very impoverished area of my State. Those are things that are turning over in my mind. We need to be more creative—not in finding ways to spend money, but in finding ways to anticipate what the problems are going to be next year, and 5 years from now. They are going to be real.

We are going to be faced with the necessity of doing something for those fish runs. I do not think that is hypothetical; I think that is absolute. It is real. It is imminent. And we either plan for that now so that we can do it in the most beneficial way and the least destructive way, or we are going to be forced to do it in a way that may, in fact, turn out to be much more costly to the region and to the taxpayers of the country.

I invite you to give us some thoughts informally.

Mr. PAGE. We will do that.

Senator McCLURE. I know your process of following all the OMB guidelines, but I want to do a little brainstorming, because the old guidelines do not fit this situation. I am really very, very much concerned that all the economic dislocation we see with the spotted owl would look like nothing compared to what would happen if you have to change the management of the entire Columbia River system.

ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Mr. Chairman, thank you very much. I have some other questions that I would like to submit for the record, for response in writing.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR McCLURE

SALMON RIVER, IDAHO

Senator MCCLURE. I remain concerned about the funding for the research on frazil ice on the Salmon River in Salmon, Idaho. In last year's appropriation bill I requested, and the committee agreed upon, the use of available funds to complete this research on the Salmon River. Due to uncooperative weather it was never cold enough for the frazil ice to form, thus the research was never completed. Are there adequate funds within the Administration's budget for completion of this research if conditions are such that the ice appears?

General HATCH. Sir, the ice testing work we are doing on the Salmon River at Salmon, Idaho, is being funded under Section 205 of the Continuing Authorities program. The Administration's budget contains sufficient funds to continue this work in the budget year.

Senator MCCLURE. Will the Corps complete the study this year if conditions warrant?

General HATCH. Sir, two years of successful ice testing is required in order to determine if an ice control structure would work on the Salmon River. Ice testing was scheduled for the winters of 1989-1990 and 1990-1991. Due to relatively mild weather last winter, however, an ice jam did not develop at the ice boom and only limited information on ice jam formations was obtained. Accordingly, an additional year of ice testing will be required extending the ice testing program into the winter of 1991-1992.

FISH BY-PASS FACILITIES

Senator MCCLURE. I have another question concerning the need for funds for fish bypass facilities for six mainstem dams on the Columbia and its Tributaries. The President's Budget proposal, (for the first time, I might note) has provided $14.8 million to continue construction of bypass facilities at four mainstem dams: Lower Granite, Little Goose, Lower Monumental and McNary. I fully support this proposal and will work hard to maintain this funding.

The 1991 budget makes dramatic changes in budget priorities, but still does not include funds for new bypass facilities at two Corps projects: Ice Harbor and The Dalles. I recommend that an additional $5 million be added by this subcommittee to continue work already begun at these two projects. Would the Corps use these additional funds to complete design and construction at Ice Harbor, and to continue prototype construction of extended screens and to design bypass facilities at The Dalles?

General HATCH. Yes, sir we are prepared to execute whatever Congress directs, as was clearly indicated by Secretary Page. With such additional funding in FY 91, the Corps would complete design of the Ice Harbor Juvenile Fish Bypass and would begin construction of these facilities. The Corps would begin construction of prototype extended screens and continue design of the bypass facilities at The Dalles. However, our position is that all interests are better served by deferring the work on these two dams until the end of FY 1992 when the results of our proposed mitigation analysis will be available. This analysis will increase understanding of the problem, which is much more complicated than is generally assumed, and focus our part of the Federal effort on measures most effective in improving the status of the fishery.

CLIFTON, AZ, FLOOD CONTROL PROJECT

Senator JOHNSTON. Senator DeConcini.

Senator DECONCINI. Thank you, Mr. Chairman. Thank you, Senator from New Mexico.

Secretary Page, I have a couple of parochial questions that maybe you and General Hatch can help me with. I am greatly concerned about the Chief's report for the Clifton, AZ, flood control project. That has not been transmitted to the Congress. I wrote to you in December of last year asking that this be done as soon as possible and you responded by letter January 26, 1990. I would ask the chairman to let me enter those letters in the record.

Senator JOHNSTON. Without objection, the letters will be made part of the record.

[The letters follow:]

LETTER FROM SENATOR DENNIS DECONCINI

DECEMBER 21, 1989.

Mr. ROBERT W. PAGE,
Assistant Secretary of the Army (Civil Works), Department of the Army, The Pentagon, Washington, DC.

DEAR MR. SECRETARY: I am inquiring as to the status of the Chief's report on the flood control project in Clifton, Arizona. As you know, Congress will begin preparing the 1990 Water Resources Development Act shortly and it is my hope and desire that this much needed and long awaited project will be authorized in this legislation. Accordingly, the timely transmittal of this report to the respective committees is necessary to ensure its consideration in this legislation.

Please review this matter with your staff to determine the status of this report and when you expect it to be sent to Congress. Please forward your findings to me in my Washington office. Should you have any questions concerning this request, please contact David Steel of my staff at (202) 224-4521.

Your efforts in this regard are certainly appreciated.

Sincerely,

DENNIS DECONCINI,
United States Senator.

LETTER FROM ROBERT W. PAGE

JANUARY 26, 1990.

Honorable DENNIS DECONCINI,
United States Senate,
Washington, DC.

DEAR SENATOR DECONCINI: Thank you for your letter of December 21, 1989, regardng the status of the Chief of Engineers' report on the flood control project in Clifton, Arizona.

We are reviewing the Clifton, Arizona project in conjunction with the Office of Management and Budget to determine the relationship of the proposed project to the program of the President. We anticipate this review will be completed in sufficient time to determine an Administration position for a 1990 Water Resources Development Bill.

Sincerely,

ROBERT W. PAGE,
Assistant Secretary of the Army (Civil Works).

Senator DECONCINI. You indicated that OMB was still reviewing the report, and was expected to finish in sufficient time to get this project authorized this year. However, I understand that this still has not come about.

As you know, $650,000 was appropriated for the project in 1990. It is my understanding that this funding would enable the Corps to complete the preconstruction engineering and design on the project this year and, pending authorization and funding, we will be able to start construction in 1991. This is a very important water project for this part of my state and the safety of the people that live there. I want you to know that I intend to work with the Chairman, who has been very helpful, and I want to thank you for the time that your staff has put in, but I really have some problems as to what do we do next.

Can you tell us what the current status of the Chief's report is for the Clifton project and what is the reason that it is being held up, if you know.

Mr. PAGE. Well, Senator, there were a number of questions that had arisen, but, as I have learned over the past few days, OMB and our staff will meet on May 15 to resolve those questions. We hope we can proceed very shortly after that. Now, certainly that gives us enough time to make the schedule that you mentioned.

Senator DECONCINI. If the decision is made that we can proceed sometime during the month of May, are we looking to start shortly thereafter?

Mr. PAGE. Yes, sir; May 15.

Senator DECONCINI. That is very helpful, Mr. Secretary, and I thank you for your support of the project. We will do anything we can, of course, to get it approved by OMB as well. I appreciate the answer to that question.

PHOENIX GOODYEAR AIRPORT SUPERFUND SITE

General Hatch, maybe you can help me with this. While the issue is not about a water development project, I feel that in view of its urgency and importance, the hearing today provides an ideal opportunity for me to raise it. It's about the Phoenix Goodyear Airport Superfund site. We talked to your staff before these hearings so you would not be caught totally off guard in case you had not had a chance to review it a little bit.

It is my understanding that the Corps is a potentially responsible party or PRP, at the Phoenix Goodyear Airport Superfund site. For some time now, the Corps has been working with the other PRP's to develop a voluntary cost-sharing agreement so that cleanup activities at this site can proceed in a timely fashion. However, after having established this cooperative working relationship, the Corps now appears to be unwilling to share in further remediation activities or to discuss further participation with the other PRP's.

This troubles me, because this could result in a delay of the entire cleanup of the site. The EPA has set a May 7 deadline for the receipt of good faith offers from the PRP's. Can you give us an update? When do you anticipate the Corps' presenting its good faith proposal to the EPA? Will it make it by May 7? Can you give us any update?

General HATCH. Yes, sir; as you know, this is part of the formerly used defense site, or FUDS, component of the Defense Environmental Restoration Program, or DERP.

Senator DECONCINI. Yes, sir.

General HATCH. And the Department of Defense and Goodyear are potentially responsible parties for the cleanup of that site, as you well know. There are three aquifers beneath the site which complicate the matter considerably. There was a naval air station there in World War II and Goodyear operated a plant adjacent to it.

The Corps of Engineers does represent the DOD in negotiating DOD's share of the cleanup costs. The cleanup is moving ahead in two phases. Goodyear and DOD did agree on an allocation of responsibility for one aquifer using an ultimate dispute resolution procedure, which was quite satisfactory—a minitrial, if you will. Work on cleaning up that aquifer is underway with the ground water treatment plant completed and operational.

The parties are engaged in negotiations with EPA and the Department of Justice to determine responsibility and cost allocation for the other two aquifers and the ground contamination. The most recent meeting was held on the first of this month, and the Corps of Engineers will provide a good faith estimate to the EPA on May 7.

Senator DECONCINI. Thank you for that answer. Then, I take it, there is no policy impediment to proceed with this?

General HATCH. Not that I am aware of, sir.

Senator DECONCINI. Well, thank you, General. It is very important to this part of Maricopa County, which is near Phoenix, and I really appreciate the attitude that the Corps is taking here in meeting its responsibility. I know you have got a lot to do, but this one could be a pressing one. I am pleased that you are going to meet that deadline.

I take it you are in constant contact with the other PRP's in dealing with this project? I guess that goes without saying.

General HATCH. Yes, sir.

ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Senator DECONCINI. I thank you very much and, Secretary Page, thank you.

Mr. Chairman, I have some other questions. I will just submit them for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR DECONCINI

HOLBROOK FLOOD CONTROL PROJECT

Senator DECONCINI. When does the Corps anticipate having the General Design Memorandum completed for the Holbrook flood control project? Is there sufficient funding in the FY 90 budget to accomplish this?

General HATCH. The Holbrook project was not funded in the FY 1990 budget. The Appropriations Committees of both Houses have recently concurred with a Corps proposal to reprogram $150,000 from other projects with funds surplus to this year's needs. With these funds the General Design Memorandum can be completed this fiscal year.

Senator DECONCINI. Will construction on this project be able to proceed in FY 91? What is your capability in FY 91 for the Holbrook flood control project?

General HATCH. The Corps will not be ready to start construction in FY 1991. Subject to the usual conditions, the Corps could use $960,000 in FY 1991 for preparation of plans and specifications for the project.

NOGALES WASH FLOOD CONTROL PROJECT

Senator DECONCINI. I see in the FY 91 budget request that there is $300,000 for the Nogales Wash flood control project.

What is the status of this project? When does the Corps anticipate being in a position to commence construction on this project assuming funding and authorization?

General HATCH. The Corps is currently preparing the Basis of Design and plans and specifications for the project and the requested funds for FY 1991 would be used to complete these activities in June 1991. Assuming funding, authorization and the timely execution of a local cost sharing agreement, the project could be ready for construction in the fall of 1991.

Senator DECONCINI. What is the status of the Chief's Report for this project? When do you anticipate it being transmitted to Congress?

General HATCH. The Chief of Engineers Report, dated February 28, 1989, was submitted to the Assistant Secretary of the Army, Civil Works in March 1989 and subsequently to OMB in September 1989. The project was recommended by the Assistant Secretary for authorization in the Water Resources Development Act of 1990 on 15 March 1990.

Senator DECONCINI. It is my understanding that the costs of this project have increased significantly from the original estimates? What do you attribute this to?

General HATCH. Primarily, the cost increases are for design changes required to accommodate the higher than expected ground water levels in the area and changes in the plan to carry the flows crossing the border through the project.

Senator DECONCINI. As you know, the General Services Administration is constructing a federal building in the vicinity of this project. What is the level of cooperation between the Corps and GSA as the planning proceeds on your respective projects? How may these projects affect each other?

General HATCH. The Corps and GSA are working closely in both the design and the scheduling of the respective projects to assure the maximum compatibility possible. It has been agreed that GSA will design the flood control features of the Corps project that are integral to the GSA building.

MARICOPA COUNTY FLOOD CONTROL STUDIES

Senator DECONCINI. As you are aware, the Corps has the authority to undertake flood control studies to determine the likelihood of developing flood control solutions that would warrant Federal participation.

The Flood Control District of Maricopa County is concerned about the potential for flood damages in a rapidly growing area of Central Maricopa County. The District has requested the Corps to undertake a reconnaissance level study of potential solutions to the flooding problems in this area.

What is the Corps' capability to undertake such a study as requested by the Flood Control District of Maricopa County in FY 91?

General HATCH. Subject to the unusual conditions, the Corps has a capability of $500,000 to initiate and complete a reconnaissance study in 12 months.

Senator DECONCINI. The District has also requested a reconnaissance study to be conducted in the Wickenburg area. This is an area where rapid population and development growth has increased the potential for much more serious damage and potential loss of life than has historically occurred in this area due to flooding.

What is the Corps' capability to undertake such a study as requested by the Flood Control District of Maricopa County in FY 91?

General HATCH. Subject to the same conditions, the Corps has a capability of $300,000 to initiate and complete a reconnaissance study in 12 months.

PINAL COUNTY FLOODPLAIN MANAGEMENT

Senator DECONCINI. Pinal County has requested Floodplain Management investigations under Section 206 of the Flood Control Act of 1960 investigation for four areas, McClellan Wash, Vekoi ~~Wash,~~ Canada Del Oro, and Queen Creek. It has also requested help with general planning assistance to review their Floodplain Management and Drainage Ordinances, operating policies, and to estimate required local funding levels and a 5 year construction plan. Furthermore, assistance has been requested for Flood Warning and Emergencies Preparedness Procedures for Gila River downstream from San Carlos and San Pedro River.

What is the capability of the Corps to conduct the Floodplain Management investigations and give the assistance with general planning that Pinal County has requested in FY 91?

General HATCH. The Floodplain Management Program is funded on a National level, and the Corps does not express capabilities, as such, for that program. However, we estimate the studies requested by Pinal County would cost about $500,000 and if the funds were provided, subject to the conditions normally applied to capabilities, the Corps could accomplish that work.

PHOENIX-GOODYEAR AIRPORT SUPERFUND SITE

Senator DECONCINI. It is my understanding that the Department of the Navy, at various times in the history of the site, owned substantial portions of it. In light of this ownership position, how does the Corps of Engineers now justify its position that it has only deminimis liability under CERCLA/SARA for cleanup of TCE contamination at the site?

It is my understanding that during World War II the Navy adopted a policy of indemnifying contractors for risk of loss or damage to government-owned facilities and certain liability to third persons arising out of performance of Navy contracts. Moreover, it is my understanding that it is DOD's policy to indemnify its contractors for Superfund cleanup costs. DOD has already done this at two sites where the Air Force and Army have agreed to pay a substantial amount of the cost of TCE clean-up. In light of this past Federal government practice and precedent as well as current DOD policy, what is the justification for the Corps current position with respect to its denial of any obligation to indemnify Goodyear for its Superfund liabilities at the Litchfield site?

General HATCH. Sir, in order to explain DOD policy as applied to the Phoenix Goodyear Site, first, I need to clarify the ownership and operations on this site. The site is made up of two separate adjacent facilities, the Goodyear Astrospace Corporation (GAC) Facility and the Navy Air Facility (NAF). The following is a synopsis of the ownership of the two facilities, as well as information on the history of operations at the two facilities and on indemnification:

Ownership

GAC Facility

1931-1941 - Goodyear owned the entire site.

1941 - Goodyear began development of the GAC facility. In that same time frame, due to World War II, a quasi-government agency known as the Defense Plant Corporation (DPC) was set up to finance the development of plants to support the war efforts. GAC operations were the manufacturing and assembly of aircraft. The DPC, which was not part of DOD, leased and/or purchased the GAC facility and financed the rapid expansion of the facility. Eventually, DPC owned the entire GAC facility, but leased it back to GAC for operations. Thus, the facility was not a Government owned, contractor operated, facility. It was operated under a standard commercial lease with indemnification clauses.

1946-1949 - The DPC and the War Asset Administration (a Federal agency that was not part of DOD) owned the plant, which was closed at the time.

1949-1987 - The GAC purchased the plant and owned and operated it until the facility was sold to Loral Defense Systems in 1987.

The Navy never owned any portion of the GAC facility.

Navy Air Facility

1943-1968 - The Navy owned the facility and developed the site from 1943 to 1956. In early years, the NAF's mission was to accept planes manufactured and assembled at GAC. Later missions were primarily to store, provide kit modifications for, and preserve and depreserve airplanes.

1968 to Present - The City of Phoenix purchased the NAF for use as a municipal airport. It leased much of the facility to tenants who conducted a variety of operations. GAC leased several buildings from the City between 1968 and 1976.

Operation

Ownership of property is one of several factors considered in DOD's position that it was a deminimis party. Another factor is operation. The GAC was an industrial operation with high use of TCE. The GAC's use of TCE also increased after the WWII as large degreasers were purchased. The Navy's use of TCE, on the other hand, was low. The Remedial Investigation/Feasibility Study conducted by EPA on the site indicates that the GAC storm and industrial sewers, which are part of the GAC facility, are the source of contamination. These sewers discharge onto the former NAF site. The soil contamination targeted for remediation is associated with the sewers and the GAC facility. The Corps, which represents DOD for Formerly Used Defense Sites, recognized that an independent analysis would be necessary in order to develop a fair share offer for settling DOD's responsibility. Therefore, it hired a contractor to analyze the site background use and evidence of responsibility. That contractor report formed the basis of the DOD proposed cost allocations.

Indemnification

Regarding possible indemnification during World War II, we have been unable to find information to suggest that the Navy indemnified the contractor during WWII. We do know, however, that the Navy did not own the facilities from which Goodyear is claiming indemnification. We also can confirm that the Army did not have such an indemnification policy. Moreover, it is not DOD's current policy to indemnify its contractors against Superfund cleanup costs, nor from site liability for contractor facilities.

Senator DECONCINI. It is my understanding that the Corps' position is that it has no liability for further cleanup of the Litchfield site. Can you describe the process by which this decision was made? How much involvement did policy level officials at Corps Headquarters have in making this decision? Does the Corps' position represent its final and irrevocable decision? Or, is the Corps willing to reconsider its position in light of arguments made to it by the PRPs?

General HATCH. The DOD has admitted no liability, just as Goodyear has admitted no liability. The Corps' Omaha District, which has been designated as DOD representative in this case, has been and continues to be open to negotiations with Goodyear. A meeting is being set up for late May in Denver.

Senator DECONCINI. Since World War II, what has been DOD's policy toward contractor liability at facilities owned in part by and operated largely on behalf of the Navy (Army, or Air Force)? Has this policy evolved over time? If so, how?

General HATCH. As stated previously, DOD's policy is, and has been, not to indemnify contractors from site liability for contractor facilities. The Navy did not own any of the GAC facility.

Senator DECONCINI. What policy, if any, with respect to liability for environmental pollution was in effect during World War II and the Korean War? What policy could Goodyear have reasonably relied upon during this period? Is the current Corps position with respect to Goodyear's liability consistent with what would be reasonable and fair public policy on this matter?

General HATCH. Liability for environmental pollution by either a private party or the Government has been established by Congress through the passage of CERCLA, which is enforced by EPA. The Corps has developed DOD's fair share allocation for this site.

Senator DECONCINI. What does the Corps proposed to do with respect to EPA's sixty-day deadline that expires on May 7, 1990? Is the Corps willing, with the other PRPs, to request an extension from EPA for more time to work out an agreeable arrangement?

General HATCH. The Corps will make its good faith offer to EPA by May 7, 1990. At the same time, we will notify Goodyear that we recommend the same offer be made to them.

Senator DECONCINI. In light of the Corps' position on the Litchfield matter, is DOD going to have to change its contracts with all of its other contractors? If so, how? If not, why not?

General HATCH. No, sir, because it continues to be DOD policy not to indemnify contractors from site liability for contractor facilities.

Senator DECONCINI. To what extent, if any, has DOD attempted to ensure that its position with regard to sharing Superfund costs with private PRPs is consistent nationwide and among the various services?

General HATCH. The Army Corps of Engineers is responsible for responding to all PRP notices in which DOD is cited as a PRP for DERP Formerly Used Defense Sites (FUDS). PRP negotiation projects are assigned by Headquarters to the Missouri River Division - the Corps' hazardous and toxic waste design center, and center of expertise for PRP negotiations.

Execution of all FUDS PRP projects by the Missouri River Division's two districts, Omaha and Kansas City, ensures consistency among the various services DOD-wide on these projects.

Senator DECONCINI. Is not a federal agency liable under CERCLA to the same extent as a private party?

General HATCH. Under CERCLA section 120, the DOD is subject to Superfund laws, including liability, in the same manner and to the same extent as any non-governmental entity.

Senator DECONCINI. It is my understanding that Goodyear has made a number of good faith proposals to share a substantial portion of the costs of cleanup at Litchfield. Can the Corps explain why it refuses to make a good faith offer to Goodyear?

General HATCH. Goodyear made one offer to the Corps, on 18 April 1990, of 100 percent Navy responsibility. We are not aware of any subsequent offers by Goodyear.

Senator DECONCINI. It is my understanding that the Navy routinely used TCE as a solvent, degreaser, and cleaner at its bases and facilities during and after World War II. Further, it is my understanding that substantial numbers of Navy personnel worked at the site from 1945 through 1962. In light of this, why does the Corps of Engineers contend that little or no TCE contamination is due to the activities of the Navy personnel who worked at the site?

General HATCH. Evidence and field data in Navy, GAC, and EPA documents, suggest only minimal use of TCE by Navy at the Litchfield NAF but heavy usage by Goodyear. Although Navy personnel, from another subcommand, did occupy a portion of the GAC property, that command was not involved with the work being done on the Navy property, nor were they involved with the use or disposal of TCE on the GAC property. However, GAC did have people on Navy property involved with Navy work. GAC manpower levels were approximately twice as high as those of the Navy.

Senator DECONCINI. In the Corps opinion, does CERCLA/SARA preclude "mixed" funding of a Superfund site remedy? If so, what is its rationale for this position?

General HATCH. It is the Corps' opinion that CERCLA/SARA does not preclude mixed funding of a Superfund site remedy. On the contrary, EPA has a very active mixed funding program. However, we defer to the EPA regarding appropriate use of mixed funding.

Senator DECONCINI. Could you explain the Corps position on SARA Section 211?

General HATCH. SARA Section 211 amends the general authority for the Defense Environmental Restoration Program, under which we are pursuing DOD site cleanups.

Senator DECONCINI. What administrative procedures must the PRPs follow to obtain an offer and enter into formal negotiations with the Corps?

General HATCH. Goodyear should contact the Corps' Omaha District, which is DOD's representative. However, we have given Goodyear our recommendation for an offer and have been negotiating with them.

Senator DECONCINI. What is the Corps' position on the source of contamination of the deep aquifers on the Litchfield site? What evidence or analysis does the Corps have to refute the claim that this contamination comes from multipoint sources of TCE resulting from Navy surface activities conducted by or on behalf of the Navy during World War II, the late 1940's, the years of the Korean war, and the mid to late 1950's?

General HATCH. Based on well supported data in the RI/FS, the Corps believes that the primary source of contamination for the deep aquifer, known as Subunit B/C, is the shallow aquifer known as Subunit A. EPA designated Subunit A as a source control measure for expedited cleanup in order to reduce the potential for further contamination of Subunit B/C. Cleanup of Subunit A is underway. However, the ultimate source of contamination is believed to be the GAC sewers.

Senator DECONCINI. Can the Corps outline its position on the degree of control exercised by the Navy over Goodyear activities at the site? Was the Navy's relationship to Goodyear substantially different from its relationship with other contractors? If so, what elements of the Navy's contractual relationship with Goodyear were different? Is it these differences that result in the Corps' position that Goodyear alone is responsible for environmental pollution at the Litchfield site? At any time during the Navy's oversight of Goodyear's activities at Litchfield, was Goodyear made specifically aware that this responsibility and liability existed?

General HATCH. The function of the Navy's inspectors was to inspect end-products (airplanes) and/or parts of assemblies for acceptance. Day-to-day operational control was maintained by GAC and its inspectors. Therefore, Goodyear's responsibility is based on the absence of Navy control over the GAC facility, which is the source of pollution.

Senator DECONCINI. In light of the long history of Federal Government, particularly Navy, involvement with the Litchfield site (as an owner, operator, financier, and purchaser of products and services), what justification can the Corps offer for the position that Goodyear was solely in charge of operations at the site, and, by implication, that the Navy had no operational control over the site during its many years of involvement with it?

General HATCH. The Navy was neither the owner nor the operator of the GAC facility. When the GAC facility was not owned by GAC, it was being leased by GAC under a commercial lease for its operations, as previously explained. The roles of GAC and Navy inspectors, as outlined in the previous answer, were identified by documentation provided to the Corps by Goodyear.

Senator DECONCINI. Can the Navy offer definitive evidence that, during the period of Goodyear's involvement with the site, (1) the Navy did not direct its contractors to use TCE as a cleaner and solvent, and (2) the Navy prescribed specific methods for TCE's use and subsequent disposal? If not, what guidance did the Navy give to its contractors for the use and disposal of TCE? Was this guidance, by today's standards, adequate to fully instruct contractors in the safe use and disposal of TCE? If not, does not the Navy now have the obligation to share in the costs of the cleanup of TCE contamination resulting from what was once considered to be the routine and safe handling, use and disposal of the product?

General HATCH. There is no evidence that the Navy directed GAC's usage of TCE or directed or controlled disposal of TCE. CERCLA applies to sites and to owners/operators who were responsible for contamination, regardless of what was routine practice in the past.

ARIZONA CROSS-DIVERSION CANAL

Senator DECONCINI. I see in the FY 91 budget request that there is $34.4 million to continue with the construction on the Arizona Cross-Diversion Canal.

What is the status of the construction of that project? When do you anticipate it being completed? Will the $34.4 million allow the Corps to work at its full capability in FY 91?

General HATCH. Construction of Reach 2 of the Arizona Canal Diversion Channel (abbreviated as ACDC) and Cave Creek are nearing completion and Reach 3 is well under way, with completion scheduled in July 1991. We expect to advertise Reach 4, the last reach, in early July this year, with a contract award in late September. The $34.4 million requested in the President's Budget is our full capability.

Senator DECONCINI. Concerns have been expressed to me by the residents living in the vicinity of this project about the impacts the canal will have on their homes, both during and after construction. What is being done to address these concerns? Are specific proposals being considered to address these concerns? If so, what are the cost estimates for these proposals? Who would be responsible for paying for the modifications to accommodate these local concerns, the Corps or the local sponsor?

General HATCH. The predominant concern over the ACDC is its esthetics impacts. Over the past several years the Corps, the local sponsor, Flood Control District of Maricopa County, and the City of Phoenix have worked hard to improve the appearance of the project. Measures taken include coloring the concrete to blend with the surrounding earth; tubular steel fencing, which provides a higher degree of safety than the traditional chain link fence and is also more attractive; visual barrier walls to screen the channel from homes that face it directly; and intensified landscaping in critical areas such as street intersections. Local citizens have repeatedly requested that the channel be covered, that is, placed underground. Although to cover the channel would be technically feasible for much of its length, the cost would be much higher, on the order of $2,000 per foot more. The most recent such proposal came from the Town of Paradise Valley, and we are presently developing a detailed cost estimate to determine a more precise cost differential for their plan. In order to provide a project with maximum net benefits to the national economy, Executive Branch policy is to construct the least costly design that will accomplish the mission, which in the case of the ACDC is an open concrete channel. The determination of least cost is made irrespective of how costs are shared between the Federal government and the local sponsor. If local interests prefer a more costly plan, their plan can be implemented if they assume the increase in project costs and if the locally preferred plan does not decrease the benefits to be derived from the project.

Senator DECONCINI. How does the Corps characterize the support this project enjoys locally?

General HATCH. The project is strongly supported by the local sponsor and by the City of Phoenix. The City is not a sponsor and, therefore, does not share directly in the costs of the project; however, the great majority of the beneficiaries of the Phoenix and Vicinity project and all of the beneficiaries of Reach 4 of the ACDC live in Phoenix. The City of Phoenix has designed and built its storm drains in anticipation of the project being completed and a change would result in tremendous physical and financial problems to the city. The city council has taken a very active interest in the project because they represent many of the critics of the project as well as the beneficiaries. Over the past several years, the council has heard testimony on the project repeatedly and they have sponsored their own citizens committees to address both the justification for and the esthetics of the ACDC. As a result of their public involvement activity, the council has maintained their support of the project, while continually emphasizing their concern over its esthetic impacts and pressing the Corps and the Flood Control District to do as much as possible to mitigate those impacts.

ACEQUIAS IRRIGATION SYSTEM, NEW MEXICO

Senator JOHNSTON. Thank you, Senator DeConcini.

Senator Domenici.

Senator DOMENICI. Thank you very much, Mr. Chairman.

Mr. Secretary, I am pleased that the President's budget proposes an appropriation of $2 million in fiscal year 1991 for additional work on the New Mexico acequias. As you are aware, we have struggled with this for some time. I am delighted that the administration now recognizes the important historical and environmental benefits from the acequias program.

Would you provide us with an update on the work undertaken to date, as well as an outline of what you expect to accomplish with the additional funds during fiscal year 1991?

Mr. PAGE. Since the initial local cooperation agreement was signed in August 1988, 18 acequia projects have been designed, construction contracts awarded for 16, and construction completed on 14. Design is now in progress on two acequia projects and award of four construction contracts is scheduled for this fiscal year. The initiation of design on about 10 projects and award of construction contracts for about 5 acequia projects are scheduled with the additional funds during fiscal year 1991.

MIDDLE RIO GRANDE, BERNALILLO TO BELEN, NM

Senator DOMENICI. Let me talk about a project we call the Albuquerque levees. This is a project that I think is important to get on with. I think you all know it as the middle Rio Grande project—Bernalillo to Belen project.

Mr. PAGE. Yes, sir.

Senator DOMENICI. But we in New Mexico call it the Albuquerque levees. We have had a problem with the Corps for quite awhile on determining whether the lands contributed by the non-Federal sponsors should be included in the base costs of the project, as of 1986. You know my position. Clearly, those costs should have been counted then, and should be now. But, I urge you, in all events, to resolve this question as soon as possible.

Mr. PAGE. Yes, sir; there is a study underway. I know your concern about triggering a section 902 cost increase problem.

Senator DOMENICI. Right.

Mr. PAGE. You are looking at about $11 million, I guess, based on initial evaluation. It may be substantially less than that.

Our preliminary review indicates that this would not trigger a section 902 limitation, but I can assure you that counsel has not ruled on it. It is under interpretation and consideration at this point and we expect an answer shortly, and I mean shortly. That would be within a week, possibly.

Senator DOMENICI. So we can complete the record here for the appropriation process. I think I am accurate, am I not, in saying that once the authorization problem that we have just discussed is behind us, you do have the capability to proceed if we were to approve the startup money?

Mr. PAGE. Yes; we do, Senator.

Senator DOMENICI. And do I understand that capability is about $1.3 million? I think it is somewhere in that area?

Mr. PAGE. Yes, sir.

SAN ACACIA BOSQUE DEL APACHE, NM, PROJECT

Senator DOMENICI. Let me talk about another item that has just come up, but is of long standing. I think it is a very interesting one. It is called the San Acacia Bosque del Apache project. Are any of you aware of this project?

Sir, let me tell you the problem. About 70 percent of this project's benefits will go to the Federal Government, in particular, the Department of the Interior project called the Bosque del Apache National Wildlife Refuge, and the Bureau of Reclamation's low-flow channel. The Del Apache National Wildlife Refuge is a very, very popular and nationally significant one. The Interior Department will benefit dramatically from this project.

Here is the hangup. New Mexico is willing to look for its 25-percent share of funding. The Department of the Interior informs us that completion of this project is very important to the Department because of this wildlife refuge, and is willing to contribute about $5 million toward the non-Corps share of project costs.

Now, as I look at it, it seems like a pretty good deal for the Federal Government. The only problem that I am aware of is that, apparently, the Corps has said that the Department of the Interior cannot make this contribution, even though similar contributions have been made by other agencies.

I don't think this is a very prudent position. If we can get $5 million from Interior to benefit a very nationally significant refuge and apply it to the project because of benefits——

Mr. PAGE. I do not see why not, Senator. We will look at that. I do not know where that came from. That, obviously, would be part of our Federal share.

Senator DOMENICI. Well, I hope we can resolve this issue. We can get this project done if we do it that way. The Department of the Interior is willing to commit to $5 million to promote this important project. We think your own estimates will show it is to their benefit.

Mr. PAGE. We have looked at the cost-sharing provisions of Public Law 99-662 for projects that have flood control as the primary benefit. No current administrative determination can change the legal status of this project as authorized for construction by the Corps for flood control purposes. Even though the Bureau of Reclamation will benefit from this project, their $5 million share would be credited toward the Federal share of the project cost, not the non-Federal share. I believe there may have been a misunderstanding on whose account would receive credit.

Senator DOMENICI. I have three other questions. I am only going to ask you about one, and I will put the others in the record.

ALAMOGORDO, NM, PROJECT

There is a project in the city of Alamogordo that we have been working on for a long time. The city is working on financing for a local cooperation agreement once the Corps has redesigned the project. We have already appropriated $7.4 million for this project, Mr. Secretary. We have had to go through redesign to satisfy some local concerns. You have had to do that.

I just want to be assured that we are going to hold that money, at least through the redesign, so that these people can have a last shot at coming up with their local match.

Mr. PAGE. Yes.

Senator DOMENICI. Do I understand that that is what is intended?

Mr. PAGE. I am saying yes, it is what is intended.

ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Senator DOMENICI. All right; fine.

I will put my other questions in the record, and I thank you very much.

Thank you, Mr. Secretary.

Mr. PAGE. Thank you, sir.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR DOMENICI

COCHITI DAM

Senator DOMENICI. For a number of years, I have been working with the Cochiti Pueblo and the Corps to resolve problems involving seepage onto important agricultural lands of the Cochiti Pueblo, just below Cochiti Dam.

As I understand it, officials of the Albuquerque District and the Pueblo will be meeting tomorrow in an effort to work out final language on a project. I would urge that you direct the Corps to act as rapidly as possible on the report once the District Engineer and the Pueblo reach agreement.

Mr. PAGE. Throughout Fiscal Years 1988 and 1989, the Pueblo and the Albuquerque District Corps of Engineers developed the base data and design for a recommended solution to resolve the high groundwater problems on the Pueblo lands. The solution presently acceptable to both parties includes construction of a drain system for the agricultural lands below Cochiti Dam, the establishment of an operation, maintenance and replacement fund for the project to be administered by the Bureau of Indian Affairs, and a settlement of past damage claims. Once a final solution has been negotiated and an estimated cost determined, the Administration will submit them to Congress.

As of January 1990, the Pueblo and the Albuquerque District Corps of Engineers had reached agreement on the major issues and prepared a draft report for review by the parties. On May 4, a meeting was held with the Pueblo representatives to resolve the final issues. The only remaining significant issue involves the identification of the areas of the Pueblo to be exempted from future damage claims for seepage related problems. The Pueblo are currently considering the suggestion developed by the parties in the above meeting.

BELEN, NM

Senator DOMENICI. As you are aware, I introduced S. 923 last year to authorize construction of a project to protect the City of Belen from flooding of the West Mesa. This is an important and necessary project, one for which the City of Belen has agrred to contribute considerably more than the standard 25 percent local cost sharing.

I am committed to this project. In fact, I wrote to you earlier this year to express my interest, seeking your views on this and other pending water resources projects. As far as I am able to determine, that response has not been provided.

Mr. PAGE. A response to your letter was provided on April 18, 1990. A copy of that correspondence is provided for the record.

LETTER FROM ROBERT W. PAGE

18 APR 1990

Honorable Pete V. Domenici
United States Senate
Washington, D. C. 20510-6100

Dear Senator Domenici:

This is in response to your letter of March 1, 1990, requesting the views of the Department of the Army on Senate Bill 2183, 101st Congress, and a copy of the Administration's proposed water resources development legislation. You also asked for our support of the flood control project for the City of Belen, New Mexico.

Enclosed is a copy of my letter to Senator Burdick that provides detailed comments on each section of the Senate's bill. Also enclosed is a copy of the Administration's draft bill entitled the "Water Resources Development Act of 1990."

I understand your concern and interest to solve the severe flooding problems for the City of Belen. As you know, the Army Corps of Engineers has made several attempts over the last decade to formulate a plan to alleviate these problems, but unfortunately an economically feasible plan could not be developed. Since no plan could be economically justified, the district concluded its investigations and no formal report was prepared for Washington level action. I regret that we can not support a flood control project for the City of Belen at this time.

Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Robert W. Page

Robert W. Page
Assistant Secretary of the Army
(Civil Works)

Senator DOMENICI. I would urge you to review your position on the Belen project, and then provide me with your detailed analysis on why the Corps rejects a project where the local sponsor is willing to pay more than its fair share of the costs.

Mr. PAGE. The Administration's budgeting criteria is to support flood control and navigation projects with high economic returns. The reason for this policy is to insure that limited Federal funds are used most productively. Accordingly, we do not support Federal participation in projects that do not have Benefit-Cost ratios greater than unity, although that authority is granted under Section 903(c) of P.L. 99-662. We are willing, however, to accommodate uneconomic elements of a Federal project in those cases where the sponsor would pay 100% of the costs of the uneconomic increment.

Senator DOMENICI. In addition, would you provide me with a list of all flood control projects where the local sponsors have offered to pay cost sharing over and above the standard rates of 25 percent or the value of the lands plus 5 percent.

Mr. PAGE. There has been little interest in Section 903(c) of the WRDA of 1986, the Benefit-Cost Waiver. The only request for guidance on the use of this provision was on a proposed flood control project for the Cape Girardeau-Jackson Metropolitan Area, Missouri. The policy for locally preferred plans is applied to Section 903(c) features. Under this policy, Corps of Engineers participation is limited to projects containing locally preferred elements that are additions to a plan justified on National Economic Development, that is NED, benefits. When there is an NED plan, locally preferred elements can be added, with the non-Federal sponsor paying all additional costs. If an NED plan cannot be demonstrated, which is the study finding at Belen, New Mexico, the policy precludes a recommendation for any Federal participation.

ABIQUIU DAM EMERGENCY GATES

Senator DOMENICI. The 1986 Act authorized the addition of emergency gates at Abiquiu Dam to improve the safe operation of this facility. This year, the Congress appropriated $50,000 to the Corps for planning, engineering, and design on the gates. This money has not been released, supposedly because the Section 903[a] report has not been completed.

That report has been sent forward by the District. I would urge you to approve it as rapidly as possible so this money, already appropriated, can be released. I would also like to know what level of FY 1991 appropriation would be reasonable, and within the Corps capability, if that $50,000 is released before the summer?

Mr. PAGE. The Section 903a Report has been forwarded to me for approval. Upon approval, the appropriated funds, less the amount sequestered for the Gramm-Rudman-Hollings Act, will be released for use by the Albuquerque District to continue the design activities. An amount for a Fiscal Year 1991 capability has not been established.

Senator JOHNSTON. Thank you, Senator Domenici.

Gentlemen, you have done work in Alaska on the oilspill cleanup. I saw in the morning paper that the Governor is going to allow, or going to pursue, the use of fertilizers on the beaches there. I also saw on the evening news that they continue to wash those beaches down with hot water.

Now, I am not an expert on this, but it seems to me that washing down those beaches with hot water is a colossal waste of money and probably not very environmentally sound. And it seems to me that we would be wise to use the money that we appear to be wasting for some good environmental purposes in Alaska. For example, the park superintendent at the Chugach National Forest says he does not have a boat to patrol along his beaches. He could get it for about $500,000, but does not have the money. But they have a tremendous amount of money to wash down beaches.

Now, am I wrong in that?

Mr. PAGE. No, sir; I am reminded of a meeting attended by a group of us, including Department of Transportation, shortly after the oil spill had occurred. They came up with a plan to take a division of Army soldiers, uniformed soldiers, up there to clean those rocks by hand. Although cheaper than the method chosen, we thought that was a bad idea.

Following that meeting, we took a look at other beaches which have suffered oilspills—one in California, a very lovely beach, and the one at Cadiz—to see if we could learn some lessons. And we found that these beaches, left alone for a period of time, had been cleaned by Mother Nature.

Now, I do not know how long she took to do this, but——

Senator JOHNSTON. Well, I am sure it would be a slow process with the cold weather in Alaska. I say, I am sure—I guess it would be. But, even so, sooner or later the beaches will clean themselves. And it seems to me that washing them with hot water is doing nothing but killing the bacteria or the sea organisms, whatever is there. To the extent that they would spend that money, they ought to put it aside in some fund for use in serving the highest and best purposes.

Mr. PAGE. Yes, sir.

Senator JOHNSTON. I hesitate to suggest that officially. I started to, but, about that time, there was this controversy about selling out too cheaply. It appeared as if some fix was afoot to let Exxon off more lightly than it should. But, I swear, it seems to me like a very, very wasteful process and that we ought to use the money otherwise.

Mr. PAGE. But, they do not know how much they are spending.

Another example of Mother Nature's ability to handle oilspills is evident on the beach at Narmi. The gigantic spill there, where it is not too warm either, was cleaned naturally. It takes a while, but it eventually happens, and sometimes it is more environmentally correct to let it wash itself.

Senator JOHNSTON. General Kelly.

CLEANUP ENVIRONMENTAL ADVISORY GROUP

General KELLY. Mr. Chairman, we followed that because, as you know from our testimony last year, we had our dredges up there, which really helped out the Coast Guard.

There is an environmental advisory group composed of representatives from the State, Exxon, of course, since it is paying for the cleanup, and EPA and the Fish and Wildlife Service. They look at all the procedures on how best to clean up. I think it was mainly for show of force and political reasons that they expended over $1.5 billion in doing just what you described; and they are doing that again this year.

They have tried bioremediation, which you referred to, with limited success. Some microbes in the cold water need acceleration. They feed on the fertilizer and then on the oil. They have had limited success with this, and, I think, are continuing with it.

But, the only procedure that really has been approved is the wash procedure. And I agree that whether it does more harm than good, environmentally, is debatable.

Senator JOHNSTON. And, it seems to me, the main advantages of that are employing a lot of the locals.

General KELLY. There you go.

Senator JOHNSTON. And hiring a lot of boats and spending a lot of money. I just think it is very, very wasteful.

CORPS' ROLE IN NUCLEAR WASTE CLEANUP

Gentlemen, I am very interested in your role in nuclear waste cleanup, not only at the nuclear defense plants, Rocky Flats, etcetera. I would like to see the Corps play a role in the cleanup of nuclear waste repositories. What is the current status of your conversations with Admiral Watkins and the Department of Energy?

Mr. PAGE. We have tried to initiate a number of discussions with him and have not been successful.

General HATCH. Sir, as you may recall, over a year ago the Secretary of Defense formally offered assistance of the Corps of Engineers in that program to the Secretary of Energy. That offer continues to be under consideration and advisement within the Department of Energy, I understand.

Within the last, oh, perhaps 3 weeks, we have had some renewed discussions with them at the staff level, on the possibility of our providing some management assistance. Discussion is underway on the drafting of a memorandum of agreement to that effect.

Senator JOHNSTON. Well, I would like to state that I would want to encourage that, because I think the Corps has tremendous expertise and, with the budget situation we have today, I am afraid we are losing that expertise. We do not have enough money to spend on harbors, rivers, and dams—the flood protection and navigation works of your traditional role—not that they are not very important, but we are being starved for money for them. We ought to be able to use your expertise in areas that are really very much in need at the present time. SCC is another thing, but I think that nuclear waste cleanup is big enough to employ all your 26,000 workers and then some.

ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Gentlemen, thank you very much. Senator Specter is here. I am going to leave at this time, but will submit questions to be answered for the record. Thank you very much.

Senator SPECTER. Thank you, Mr. Chairman. Is this a permanent promotion, Senator Johnston?

Senator JOHNSTON. Absolutely.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR JOHNSTON

NEW CONSTRUCTION STARTS

Senator JOHNSTON. The budget request for FY 1991 does not include funding for new construction starts. In fiscal year 1990 the Administration requested $85.5 million for 11 new starts and the final Conference agreement included funds to start over 30 new projects. Explain the rationale for not requesting new construction starts for 1991.

Mr. PAGE. Of the 23 projects added by the Congress for FY 1990, many were likely candidates for FY 1991 new starts and, thus, were accelerated by the congressional action. The funding and personnel requirements of these activities dictate that we focus our efforts in FY 1991 on following through on projects and studies funded for initiation in prior years.

Senator JOHNSTON. Is the Administration saying that there are no additional projects ready for construction which are worthy of being started?

Mr. PAGE. No, additional construction projects are ready for starting, but should be initiated in 1992 and later because, as General Hatch explained, our plate is full.

Senator JOHNSTON. How important is it that we follow through with the commitment envisioned with enactment of the 1986 Water Resources Development Act that there be a small number of new starts routinely initiated each year?

Mr. PAGE. I believe that keeping our commitments to local sponsors to initiate new starts as programmed is important, and believe that our future budgets should reflect this. In effect, however, the FY 1991 new start program was advanced into FY 1990 through Congressional action and therefore we consider it more important at this time to concentrate our efforts on successful implementation of these projects.

Senator JOHNSTON. If funding could be found within the subcommittee's 302(b) budget allocation, would the Administration support the initiation of a small number of new starts?

Mr. PAGE. I cannot commit to a formal Administration position on this matter at this time. Administration views on this issue may vary depending on the projects involved, the total financial commitment envisioned, and whether Administration policy review processes on the projects had been completed. As stated, however, we need to focus on completing the necessary preconstruction engineering and design and getting local cooperation agreements signed for 25 of the 34 FY 1990 new starts.

Senator JOHNSTON. Provide for the record a list of those projects which are ready for construction or will be ready for construction before the start of FY 1991. The list should include the total project cost, Federal cost, non-Federal cost, funding that could be used in fiscal year 1991 to move that project forward.

Mr. PAGE. Yes.

91CAPR1 16 MAY 1990

PROJECTS AVAILABLE FOR INITIATION OF CONSTRUCTION IN FY 91

PROJECT	ESTIMATED NON-FED COST 1/ $000	ESTIMATED FEDERAL COST 1/ $000	ESTIMATED TOTAL COST 1/ $000	FY 91 BUDGET REQUEST $000	FY 91 CAPABILITY $000
DELEWARE RIVER IN VICINTIY OF CAMDEN, (BECKETT STREET TERMINAL), NJ	2,270	3,540	5,810	0	3,290
DULUTH SUPERIOR CHANNEL EXTENSION, MN & WI	6,250	7,250	13,500	0	1,000
MARSHALL, MN	2,030	5,480	7,510	0	900
FORT PIERCE HARBOR, FL	1,950	5,490	7,440	0	2,500
REDONDO BEACH (KING HARBOR), CA	2,700	5,135	7,835	0	4,350
ZINTEL CANYON DAM, WA	2,300	7,000	9,300	0	6,300

NOTE: ALTHOUGH PROJECT CAPABILITIES REFLECT THE READINESS OF THE WORK FOR ACCOMPLISHMENT, THEY ARE IN COMPETITION FOR AVAILABLE FUNDS AND MANPOWER ARMY-WIDE. IN THIS CONTEXT, THE CAPABILITY AMOUNTS SHOWN CONSIDER EACH PROJECT BY ITSELF WITHOUT REFERENCE TO THE REST OF THE PROGRAM. HOWEVER, IT IS EMPHASIZED THAT THE TOTAL AMOUNT PROPOSED FOR THE ARMY'S CIVIL WORKS PROGRAM IN THE PRESIDENT'S BUDGET IS THE APPROPRIATE AMOUNT CONSISTENT WITH THE ADMINISTRATION'S ASSESSMENT OF NATIONAL PRIORITIES FOR FEDERAL INVESTMENTS AND THE OBJECTIVES OF AVOIDING LARGE BUDGET DEFICITS AND THE SERIOUS ADVERSE EFFECT THAT GOVERNMENT BORROWING IS HAVING ON THE NATIONAL ECONOMY. IN ORDER TO MAINTAIN THESE OVERALL BUDGETARY OBJECTIVES, WE COULD ONLY UTILIZE ADDITIONAL FUNDS ON INDIVIDUAL PROJECTS IF OFFSETTING REDUCTIONS WERE TAKEN.

1/ COST ESTIMATE INCLUDES AN ALLOWANCE FOR INFLATION THROUGH THE CONSTRUCTION PERIOD.

Senator JOHNSTON. Did the Corps request any new starts from OMB at any point in the budgetary review process? If so, provide a list of those projects for the record and a brief description of each, including the amount requested for each project.

Mr. PAGE. No, for reasons explained, the Corps did not request new starts from OMB in the budget process.

HISTORY OF PREVIOUSLY FUNDED NEW STARTS

Senator JOHNSTON. The Energy and Water Appropriations Act for fiscal years 1985, 1987, 1988, and 1990 have included a number of new starts. While some of those are under construction, several have not had construction initiated for various reasons. How many projects have been funded as new construction starts from 1985 through 1990 and how many have actually had construction initiated?

Mr. PAGE. Since passage of the FY 1985 Supplemental Appropriation, 143 new construction start projects have been funded, and 78 have been started.

Senator JOHNSTON. How much funding has been included for new starts in each fiscal year from 1985 and what portion of those were actually obligated for each project?

Mr. PAGE. With your permission, I will provide that information for the record.

FY 1985 SUPPLEMENTAL - FY 1990 NEW START CONSTRUCTION PROJECTS
ALLOCATIONS AND OBLIGATIONS

DIVISION/PROJECT	FY OF FIRST CONSTRUCTION FUNDS 5/	AMOUNT IN FIRST FY	
		ALLOCATIONS ($000)	OBLIGATIONS ($000)
NEW ENGLAND			
JONESPORT HARBOR, ME	1985	0	215
PORTSMOUTH HARBOR AND PISCATAQUA RIVER, NH & ME	1987	3,000	138
REVERE BEACH, MA	1987	700	124
ST. JOHN RIVER BASIN, ME	1988	300	0
TOWN BROOK, QUINCY AND BRAINTREE, MA	1987	1,500	348
NORTH ATLANTIC			
ARDSLEY, NY	1985	0	83
ATLANTIC COAST OF MARYLAND, MD	1990	8,200	N/A
BALTIMORE HARBOR AND CHANNELS, MD & VA (50 FT DEEPENING)	1985	198	378
BARNEGAT INLET, NJ	1985	0	64
CAPE MAY INLET TO LOWER TOWNSHIP, NJ	1987	500	131
DELAWARE RIVER IN THE VICINITY OF CAMDEN, NJ	1987	1,500	1,449
FRANCIS E. WALTER DAM, PA (MODIFICATION)	1987	1,500	1,362
GREAT EGG HARBOR INLET & PECK BEACH, NJ	1990	250	N/A
KILL VAN KULL & NEWARK BAY CHANNEL, NY & NJ	1985	0	240
LIBERTY STATE PARK LEVEE AND SEAWALL, NJ	1985	0	95
LOCK HAVEN, PA	1990	7,600	N/A
MORICHES INLET, NY	1985	0	110
NORFOLK HARBOR AND CHANNELS, VA (55-FT DEEPENING)	1985	0	258
RAMAPO AND MAHWAH RIVERS, MAHWAH, NJ AND SUFFERN, NY	1990	3,300	N/A
RICHMOND, VA	1985	0	576
SHINNECOCK INLET, NY	1990	5,300	N/A
TAMAQUA, PA	1987	700	44
TANGIER ISLAND, VA (SHORE PROTECTION)	1988	200	21
VIRGINIA BEACH STREAMS, CANAL NO. TWO, VA	1985	0	45

FY 1985 SUPPLEMENTAL - FY 1990 NEW START CONSTRUCTION PROJECTS
ALLOCATIONS AND OBLIGATIONS

DIVISION/PROJECT	FY OF FIRST CONSTRUCTION FUNDS 5/	AMOUNT IN FIRST FY ALLOCATIONS ($000)	AMOUNT IN FIRST FY OBLIGATIONS ($000)
SOUTH ATLANTIC			
BLACK WARRIOR AND TOMBIGBEE RIVERS, VICINITY OF JACKSON, AL	1987	50	23
CHARLESTON HARBOR, SC	1988	2,200	5,303
CROSS FLORIDA BARGE CANAL, FL (LAND ACQUISITION)	1987	5,000	0
DADE COUNTY, NORTH OF HAULOVER BEACH PARK, FL	1985	0	13
FORT TOULOUSE, AL	1990	1,000	N/A
GULFPORT HARBOR, MS 1/	1985	0	200
HAMLET CITY LAKE, NC	1990	3,200	N/A
INDIAN RIVER COUNTY - VERO BEACH COMPONENT, FL	1988	500	47
JACKSONVILLE HARBOR, MILL COVE, FL	1987	1,000	149
KISSIMMEE RIVER, FL	1988	2,000	0
MANATEE COUNTY, FL	1990	5,000	N/A
MANATEE HARBOR, FL	1988	550	224
MIAMI HARBOR, FL (CLEANUP)	1987	200	0
MIAMI RIVER PARK, FL	1988	5,000	8
MOBILE HARBOR, AL	1985	0	115
MOUND STATE PARK, AL	1990	1,000	N/A
OATES CREEK, RICHMOND COUNTY, GA	1988	400	227
PONCE HARBOR, PR	1987	10	7
RANDLEMAN LAKE, NC	1987	2,000	474
ROANOKE RIVER UPPER BASIN, HEADWATERS AREA, VA	1990	200	N/A
SARASOTA COUNTY, FL	1990	2,000	N/A
SATILLA RIVER BASIN, GA	1990	500	N/A
SAVANNAH HARBOR, GA	1985	0	311
SOWASHEE CREEK, MS	1987	900	309
TAMPA HARBOR BRANCH CHANNELS, FL	1985	0	0
THREEMILE CREEK, AL	1987	2,300	283
VILLAGE CREEK, AL	1987	2,000	47
WILLIAM BACON OLIVER LOCK & DAM REPLACEMENT, AL	1985	0	2,762

FY 1985 SUPPLEMENTAL - FY 1990 NEW START CONSTRUCTION PROJECTS
ALLOCATIONS AND OBLIGATIONS

DIVISION/PROJECT	FY OF FIRST CONSTRUCTION FUNDS 5/	AMOUNT IN FIRST FY	
		ALLOCATIONS ($000)	OBLIGATIONS ($000)
OHIO RIVER			
CAMPGROUND LAKE, KY	1988	250	29
GALLATIN COUNTY STREAMBANK EROSION, AREA 1, OHIO RIVER, IL	1988	100	44
GALLIPOLIS LOCKS & DAM, WV & OH	1985	0	4,325
GRAYS LANDING, LOCK AND DAM 7, MONONGAHELA RIVER, PA	1988	6,800	6,620
KANAWHA RIVER, CHARLESTON, WV (STREAMBANK EROSION PROTECTION)	1988	60	20
KANAWHA RIVER, ST ALBANS, WV (STREAMBANK EROSION PROTECTION)	1988	50	11
MASSILLON, OH - WALNUT AND CHERRY STREET BRIDGES	1988	1,100	20
POINT MARION, LOCK AND DAM 8, MONONGAHELA RIVER, PA & WV	1990	17,900	N/A
SALYERSVILLE, KY	1988	300	0
WINFIELD LOCK AND DAM, WV	1990	20,800	N/A
NORTH CENTRAL			
BASSETT CREEK, MN	1985	0	362
CHASKA, MN	1988	250	23
CLEVELAND HARBOR, OH 1/ 3/	1985	0	193
COWANESQUE LAKE, PA (MODIFICATION)	1985	0	0
DES MOINES RECREATION RIVER AND GREENBELT (DRAG), IA - BENNINGTON	1988	750	195
DES MOINES RECREATION RIVER AND GREENBELT (DRAG), IA - GREENBELT	1985	0	220
ELLICOTT CREEK, NY	1985	0	879
GENEVA-ON-THE-LAKE, OH	1985	0	192
HANNIBAL, MO	1988	200	84
LITTLE CALUMET RIVER, IN	1990	2,400	N/A
LOVES PARK, IL	1990	300	N/A
MAUMEE BAY STATE PARK, OH	1988	130	7
MUCK LEVEE, IL	1988	12	10
NORTH BRANCH CHICAGO RIVER, IL	1988	4,650	3,784
O'HARE RESERVOIR, IL	1990	1,500	N/A
PORT ONTARIO, NY	1985	0	169
PRESQUE ISLE PENINSULA, PA (PERMANENT)	1988	500	201
RED ROCK DAM AND LAKE, IA	1987	500	0

FY 1985 SUPPLEMENTAL - FY 1990 NEW START CONSTRUCTION PROJECTS
ALLOCATIONS AND OBLIGATIONS

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DIVISION/PROJECT	FY OF FIRST CONSTRUCTION FUNDS 5/	AMOUNT IN FIRST FY	
		ALLOCATIONS ($000)	OBLIGATIONS ($000)
NORTH CENTRAL (CONT'D)			
RENO BEACH HOWARD FARMS, OH	1988	250	200
SHEYENNE RIVER, ND 4/	1990	5,500	N/A
SILVER BAY HARBOR OF REFUGE, MN	1987	675	0
SMALL BOAT HARBOR, BUFFALO HARBOR, NY	1990	1,000	N/A
SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN	1987	700	590
SOUTH QUINCY LEVEE AND DRAINAGE DISTRICT, IL	1987	500	230
STATE ROAD AND EBNER COULEES, WI	1988	1,100	1,180
UPPER MISS RVR SYSTEM ENVIR MANGMENT PLAN, IL, IA, MO, MN, & WI	1985	0	805
WATERLOO, IA, BRIDGES	1988	500	0
LOWER MISSISSIPPI			
ATCHAFALAYA BASIN, FLOODWAY SYSTEM, LA (MR&T)	1985	0	161
CAPE GIRARDEAU-JACKSON METRO AREA, MO	1990	500	N/A
EAST ST. LOUIS & VIC, IL	1988	1,000	207
EIGHT MILE CREEK, AR (MR&T) 1/ 2/	1985	0	423
HARRISONVILLE & IVY LANDING LEVEE DISTRICT NO. 2, IL	1990	100	N/A
HELENA HARBOR, PHILLIPS COUNTY, AR (MR&T)	1988	1,100	589
L ANGUILLE RIVER, AR (MR&T)	1988	750	73
LOCK & DAM 26, SECOND LOCK, IL & MO	1985	0	4,141
MISSISSIPPI RIVER DELTA REGION, LA (CAERNARVON) (MR&T)	1987	500	100
MISSISSIPPI RIVER SHIP CHANNEL, GULF TO BATON ROUGE, LA	1985	0	436
NONCONNAH CREEK, TN & MS(MR&T)	1990	1,500	N/A
OUACHITA RIVER LEVEES (BAWCOMVILLE AREA), LA	1988	120	99
PEARL RIVER, SLIDELL, ST. TAMMANY PARISH, LA	1985	0	53
WESTWEGO TO HARVEY CANAL, LA (HURRICANE PROTECTION)	1990	1,100	N/A

FY 1985 SUPPLEMENTAL - FY 1990 NEW START CONSTRUCTION PROJECTS
ALLOCATIONS AND OBLIGATIONS

DIVISION/PROJECT	FY OF FIRST CONSTRUCTION FUNDS 5/	AMOUNT IN FIRST FY ALLOCATIONS ($000)	AMOUNT IN FIRST FY OBLIGATIONS ($000)
SOUTHWESTERN			
ACEQUIAS IRRIGATION SYSTEM, NM	1988	1,700	552
ALAMOGORDO, NM	1988	660	164
BEAVER LAKE, AR	1990	1,100	N/A
CLEAR CREEK, TX	1985	0	333
COLORADO RIVER AND TRIBUTARIES, BOGGY CREEK AUSTIN, TX	1985	0	209
FOUNTAIN CREEK AT PUEBLO, CO	1987	700	274
FOURCHE BAYOU BASIN, LITTLE ROCK, AR	1987	500	359
FREEPORT HARBOR, TX	1985	0	0
GREAT BEND, KS	1987	1,500	179
HALSTEAD, KS	1987	1,100	160
LAKE WICHITA, HOLLIDAY CREEK AT WICHITA FALLS, TX	1987	700	684
MINGO CREEK, OK	1988	2,400	505
PARKER LAKE, OK 1/ 2/	1985	0	0
PUERCO RIVER AT GALLUP, NM	1988	460	244
RIO GRAND FLOODWAY, TRUTH OR CONSEQUENCES UNIT, NM	1988	3,800	365
SIMS BAYOU AT HOUSTON, TX	1990	4,000	N/A
MISSOURI RIVER			
MISSOURI NATIONAL RECREATIONAL RIVER, NE AND SD	1985	0	127
TRIMBLE WILDLIFE AREA, SMITHVILLE LAKE, MO	1990	1,570	N/A
WESTERLY CREEK, CO	1988	550	417
NORTH PACIFIC			
BONNEVILLE NAVIGATION LOCK, OR & WA	1985	0	6,553
GRAYS HARBOR, WA (1986 WRDA)	1990	13,000	N/A
MT. ST. HELENS SEDIMENT CONTROL, WA	1986	1,400	1,390
ST. PAUL ISLAND HARBOR, AK	1988	3,000	507

FY 1985 SUPPLEMENTAL - FY 1990 NEW START CONSTRUCTION PROJECTS ALLOCATIONS AND OBLIGATIONS

DIVISION/PROJECT	FY OF FIRST CONSTRUCTION FUNDS 5/	AMOUNT IN FIRST FY ALLOCATIONS ($000)	AMOUNT IN FIRST FY OBLIGATIONS ($000)
SOUTH PACIFIC			
CACHE CREEK SETTLING BASIN, CA	1990	5,500	N/A
FAIRFIELD VICINITY STREAMS, CA	1985	0	880
GUADALUPE RIVER, CA	1990	750	N/A
LITTLE DELL LAKE, UT	1985	0	1,272
MERCED COUNTY STREAMS, CA	1985	0	122
OAKLAND INNER HARBOR, CA	1988	7,700	3,420
OAKLAND OUTER HARBOR, CA	1987	1,500	446
PAJARO RIVER, CA	1987	500	471
REDBANK AND FANCHER CREEK, CA	1987	1,000	449
RICHMOND HARBOR, CA 1/ 3/	1985	0	345
SACRAMENTO RIVER DEEPWATER SHIP CHANNEL, CA	1985	0	611
SAN LUIS REY RIVER, CA	1987	1,000	249
SANTA ANA RIVER MAINSTEM, CA	1990	20,000	N/A
WHITEWATER RIVER FLOODWARNING SYSTEM, CA	1988	300	111
PACIFIC OCEAN			
AGANA RIVER, GU	1987	700	183
KAHOMA STREAM, MAUI, HI	1985	10	93
MAALAEA SMALL BOAT HARBOR, MAUI, HI	1990	600	N/A

NOTES:

1/ LOST NEW START STATUS BECAUSE LOCAL COOPERATION AGREEMENT WAS NOT EXECUTED BY 30 JUNE 1986.

2/ REGAINED NEW START STATUS IN FY 1987.

3/ REGAINED NEW START STATUS IN FY 1988.

4/ SHEYENNE HAS TWO SEPARABLE ELEMENTS AND WAS COUNTED BY THE ADMINISTRATION AS TWO NEW STARTS.

5/ THE FY 1985 SUPPLEMENTAL WAS SIGNED INTO LAW ON AUGUST 15, 1985 AND PROVIDED $48,000,000 FOR CONSTRUCTION, GENERAL AND $800,000 FOR MISSISSIPPI RIVER AND TRIBUTARIES. NO CONFERENCE AMOUNT WAS SPECIFICIED BY PROJECT.

Senator JOHNSTON. Provide, for the record, a table, similar to that provided in previous years, which shows each new construction start since 1985, indicating the fiscal year construction funds were first provided, if a LCA is required or not, and a brief reason why the LCA has not been executed if required? If execution is or has been constrained or delayed because of policy reasons, so state.

Mr. PAGE. Yes.

FY 1986 - 1990 NEW START CONSTRUCTION PROJECTS - LCA STATUS

DIVISION/PROJECT (1)	FY OF FIRST CONSTRUCTION FUNDS (2)	COST SHARING AGREEMENT REQUIRED (3)	COST SHARING AGREEMENT EXECUTED (4)	REASON LCA NOT EXECUTED (5)
NEW ENGLAND				
JONESPORT HARBOR, ME	1986	YES	YES	
TOWN BROOK, QUINCY AND BRAINTREE, MA	1987	YES	NO	REEVALUATING PROJECT IAW AAA REPORT
REVERE BEACH, MA	1987	YES	NO	LACK OF SPONSOR PERMITS AND FINANCING
PORTSMOUTH HARBOR AND PISCATAQUA RIVER, NH & ME	1987	YES	YES	
ST. JOHN RIVER BASIN, ME	1986	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
NORTH ATLANTIC				
ARDSLEY, NY	1986	YES	YES	
BALTIMORE HARBOR AND CHANNELS, MD & VA (50 FT DEEPENING)	1986	YES	YES	
BARNEGAT INLET, NJ	1986	YES	YES	
COWANESQUE LAKE, PA (MODIFICATION)	1986	YES	YES	
KILL VAN KULL & NEWARK BAY CHANNEL, NY & NJ	1986	YES	YES	
LIBERTY STATE PARK LEVEE AND SEAWALL, NJ	1986	YES	YES	
MORICHES INLET, NY	1986	YES	YES	
NORFOLK HARBOR AND CHANNELS, VA (55-FT DEEPENING)	1986	YES	YES	
RICHMOND, VA	1986	YES	YES	
VIRGINIA BEACH STREAMS, CANAL NO. TWO, VA	1986	YES	YES	
CAPE MAY INLET TO LOWER TOWNSHIP, NJ	1987	YES	YES	
DELAWARE RIVER IN THE VICINITY OF CAMDEN, NJ	1987	YES	YES	
FRANCIS E. WALTER DAM, PA (MODIFICATION)	1987	YES	NO	LACK OF SPONSOR FINANCING
TAMAQUA, PA	1987	YES	NO	LACK OF SPONSOR FINANCING
TANGIER ISLAND, VA (SHORE PROTECTION)	1988	YES	YES	
ATLANTIC COAST OF MARYLAND, MD	1990	YES	YES	
GREAT EGG HARBOR INLET & PECK BEACH, NJ	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
LOCK HAVEN, PA	1990	YES	NO	LACK OF SPONSOR FINANCING/HTW STUDIES UNDER REV
RAMAPO AND MAHWAH RIVERS, MAHWAH, NJ AND SUFFERN, NY	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
SHINNECOCK INLET, NY	1990	YES	NO	LCA SCHEDULED FOR EXECUTION IN MAY 1990
SOUTH ATLANTIC				
DADE COUNTY, NORTH OF HAULOVER BEACH PARK, FL	1986	YES	YES	
GULFPORT HARBOR, MS 1/	1986	YES	NO	LOST NEW START STATUS
MOBILE HARBOR, AL	1986	YES	YES	
SAVANNAH HARBOR, GA	1986	YES	YES	
TAMPA HARBOR BRANCH CHANNELS, FL	1986	YES	YES	

FY 1986 – 1990 NEW START CONSTRUCTION PROJECTS – LCA STATUS

DIVISION/PROJECT (1)	FY OF FIRST CONSTRUCTION FUNDS (2)	COST SHARING AGREEMENT REQUIRED (3)	EXECUTED (4)	REASON LCA NOT EXECUTED (5)
SOUTH ATLANTIC (CONT'D)				
WILLIAM BACON OLIVER LOCK & DAM REPLACEMENT, AL	1986	NO	NO	
BLACK WARRIOR AND TOMBIGBEE RIVERS, VICINITY OF JACKSON, AL	1987	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
CROSS FLORIDA BARGE CANAL, FL (LAND ACQUISITION)	1987	NO	NO	
JACKSONVILLE HARBOR, MILL COVE, FL	1987	YES	YES	
MIAMI HARBOR, FL (CLEANUP)	1987	NO	NO	
PONCE HARBOR, PR	1987	YES	YES	
RANDLEMAN LAKE, NC	1987	YES	NO	NOT ECONOMICALLY JUSTIFIED
BOWASHEE CREEK, MS	1987	YES	YES	
THREEMILE CREEK, AL	1987	YES	YES	
VILLAGE CREEK, AL	1987	YES	YES	
CHARLESTON HARBOR, SC	1988	YES	YES	
INDIAN RIVER COUNTY – VERO BEACH COMPONENT, FL	1988	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
KISSIMMEE RIVER, FL	1988	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
MANATEE HARBOR, FL	1988	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
MIAMI RIVER PARK, FL	1988	YES	NO	ONE YEAR FUNDING EXPIRED
OATES CREEK, RICHMOND COUNTY, GA	1988	YES	YES	
FORT TOULOUSE, AL	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
HAMLET CITY LAKE, NC	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
MANATEE COUNTY, FL	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
MOUND STATE PARK, AL	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
ROANOKE RIVER UPPER BASIN, HEADWATERS AREA, VA	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
SARASOTA COUNTY, FL	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
SATILLA RIVER BASIN, GA	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
OHIO RIVER				
GALLIPOLIS LOCKS & DAM, WV & OH	1986	NO	NO	
CAMPGROUND LAKE, KY	1988	YES	NO	NOT ECONOMICALLY JUSTIFIED
GALLATIN COUNTY STREAMBANK EROSION, AREA 1, OHIO RIVER, IL	1988	YES	NO	LOW PRIORITY OUTPUT
GRAYS LANDING, LOCK AND DAM 7, MONONGAHELA RIVER, PA	1988	NO	NO	
KANAWHA RIVER, CHARLESTON, WV (STREAMBANK EROSION PROTECTIO	1988	YES	NO	NOT ECONOMICALLY JUSTIFIED
KANAWHA RIVER, ST ALBANS, WV (STREAMBANK EROSION PROTECTION)	1988	YES	NO	LOW PRIORITY OUTPUT
MASSILLON, OH – WALNUT AND CHERRY STREET BRIDGES	1988	YES	YES	
SALYERSVILLE, KY	1988	YES	NO	LACK OF LOCAL SUPPORT FOR NED PLAN
POINT MARION, LOCK AND DAM 4, MONONGAHELA RIVER, PA & WV	1990	NO	NO	
WINFIELD LOCK AND DAM, WV	1990	NO	NO	

FY 1986 – 1990 NEW START CONSTRUCTION PROJECTS – LCA STATUS

DIVISION/PROJECT (1)	FY OF FIRST CONSTRUCTION FUNDS (2)	COST SHARING AGREEMENT REQUIRED (3)	COST SHARING AGREEMENT EXECUTED (4)	REASON LCA NOT EXECUTED (5)
NORTH CENTRAL				
BASSETT CREEK, MN	1986	YES	YES	
CLEVELAND HARBOR, OH 1/ 3/	1986	YES	YES	
DES MOINES RECREATION RIVER AND GREENBELT (DRAG), IA – GREENBE	1986	YES	YES	
ELLICOTT CREEK, NY	1986	YES	YES	
GENEVA–ON–THE–LAKE, OH	1986	YES	YES	
PORT ONTARIO, NY	1986	YES	YES	
UPPER MISS RVR SYSTEM ENVIR MANGMENT PLAN, IL, IA, MO, MN, & WI	1986	YES	YES	
RED ROCK DAM AND LAKE, IA	1987	NO	NO	
SILVER BAY HARBOR OF REFUGE, MN	1987	YES	NO	LOW PRIORITY OUTPUT
SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN	1987	YES	YES	
SOUTH QUINCY LEVEE AND DRAINAGE DISTRICT, IL	1987	YES	YES	
CHASKA, MN	1988	YES	YES	
DES MOINES RECREATION RIVER AND GREENBELT (DRAG), IA – BENNINGT	1988	YES	YES	
HANNIBAL, MO	1988	YES	YES	
MAUMEE BAY STATE PARK, OH	1988	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
MUCK LEVEE, IL	1988	YES	NO	NO FEDERAL INTEREST
NORTH BRANCH CHICAGO RIVER, IL	1988	YES	YES	
PRESQUE ISLE PENINSULA, PA (PERMANENT)	1988	YES	YES	
RENO BEACH HOWARD FARMS, OH	1988	YES	YES	
STATE ROAD AND EBNER COULEES, WI	1988	YES	YES	
WATERLOO, IA, BRIDGES	1988	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
LITTLE CALUMET RIVER, IN	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
LOVES PARK, IL	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
O'HARE RESERVOIR, IL	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
SHEYENNE RIVER, ND 4/	1990	YES	YES	
SMALL BOAT HARBOR, BUFFALO HARBOR, NY	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
LOWER MISSISSIPPI				
ATCHAFALAYA BASIN, FLOODWAY SYSTEM, LA (MR&T)	1986	NO	NO	
EIGHT MILE CREEK, AR (MR&T) 1/ 2/	1986	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
LOCK & DAM 26, SECOND LOCK, IL & MO	1986	NO	NO	
MISSISSIPPI RIVER SHIP CHANNEL, GULF TO BATON ROUGE, LA	1986	YES	YES	
PEARL RIVER, SLIDELL, ST. TAMMANY PARISH, LA	1986	YES	YES	
MISSISSIPPI RIVER DELTA REGION, LA (CAERNARVON) (MR&T)	1987	YES	YES	

FY 1985 – 1990 NEW START CONSTRUCTION PROJECTS – LCA STATUS

DIVISION/PROJECT (1)	FY OF FIRST CONSTRUCTION FUNDS (2)	COST SHARING AGREEMENT REQUIRED (3)	COST SHARING AGREEMENT EXECUTED (4)	REASON LCA NOT EXECUTED (5)
LOWER MISSISSIPPI (CONT'D)				
EAST ST. LOUIS & VIC, IL	1988	YES	YES	
HELENA HARBOR, PHILLIPS COUNTY, AR (MR&T)	1988	YES	YES	
L'ANGUILLE RIVER, AR (MR&T)	1988	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
OUACHITA RIVER LEVEES (BAWCOMVILLE AREA), LA	1988	YES	YES	
CAPE GIRARDEAU–JACKSON METRO AREA, MO	1990	YES	NO	LCA SCHEDULED FOR EXECUTION IN JUNE 1990
HARRISONVILLE & IVY LANDING LEVEE DISTRICT NO. 2, IL	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
NONCONNAH CREEK, TN & MS	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
WESTWEGO TO HARVEY CANAL, LA (HURRICANE PROTECTION)	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
SOUTHWESTERN				
CLEAR CREEK, TX	1985	YES	YES	
COLORADO RIVER AND TRIBUTARIES, BOGGY CREEK AUSTIN, TX	1985	YES	YES	
FREEPORT HARBOR, TX	1985	YES	YES	
PARKER LAKE, OK 1/ 2/	1985	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
FOUNTAIN CREEK AT PUEBLO, CO	1987	YES	YES	
FOURCHE BAYOU BASIN, LITTLE ROCK, AR	1987	YES	YES	
GREAT BEND, KS	1987	YES	YES	
HALSTEAD, KS	1987	YES	YES	
LAKE WICHITA, HOLLIDAY CREEK AT WICHITA FALLS, TX	1987	YES	YES	
ACEQUIAS IRRIGATION SYSTEM, NM	1988	YES	YES	
ALAMOGORDO, NM	1988	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
MINGO CREEK, OK	1988	YES	YES	
PUERCO RIVER AT GALLUP, NM	1988	YES	YES	
RIO GRANDE FLOODWAY, TRUTH OR CONSEQUENCES UNIT, NM	1988	YES	YES	
BEAVER LAKE, AR	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
SIMS BAYOU AT HOUSTON, TX	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED
MISSOURI RIVER				
MISSOURI NATIONAL RECREATIONAL RIVER, NE AND SD	1985	YES	YES	
WESTERLY CREEK, CO	1988	YES	YES	
TRIMBLE WILDLIFE AREA, SMITHVILLE LAKE, MO	1990	YES	NO	PRE-LCA ACTIVITIES NOT YET COMPLETED

FY 1985 – 1990 NEW START CONSTRUCTION PROJECTS – LCA STATUS

DIVISION/PROJECT (1)	FY OF FIRST CONSTRUCTION FUNDS (2)	COST SHARING AGREEMENT REQUIRED (3)	COST SHARING AGREEMENT EXECUTED (4)	REASON LCA NOT EXECUTED (5)
NORTH PACIFIC				
BONNEVILLE NAVIGATION LOCK, OR & WA	1985	NO	NO	
MT. ST. HELENS SEDIMENT CONTROL, WA	1986	YES	YES	
ST. PAUL ISLAND HARBOR, AK	1988	YES	YES	
GRAYS HARBOR, WA (1986 WRDA)	1990	YES	YES	
SOUTH PACIFIC				
MERCED COUNTY STREAMS, CA	1985	YES	YES	
LITTLE DELL LAKE, UT	1985	YES	YES	
RICHMOND HARBOR, CA 1/ 3/	1985	YES	NO	LACK OF SPONSOR FINANCING
SACRAMENTO RIVER DEEPWATER SHIP CHANNEL, CA	1985	YES	YES	
FAIRFIELD VICINITY STREAMS, CA	1985	YES	YES	
OAKLAND OUTER HARBOR, CA	1987	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
PAJARO RIVER, CA	1987	YES	YES	
SAN LUIS REY RIVER, CA	1987	YES	YES	
REDBANK AND FANCHER CREEK, CA	1987	YES	YES	
WHITEWATER RIVER FLOODWARNING SYSTEM, CA	1988	YES	YES	
OAKLAND INNER HARBOR, CA	1988	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
CACHE CREEK SETTLING BASIN, CA	1990	YES	YES	
GUADALUPE RIVER, CA	1990	YES	NO	PRE–LCA ACTIVITIES NOT YET COMPLETED
SANTA ANA RIVER MAINSTEM, CA	1990	YES	YES	
PACIFIC OCEAN				
KAHOMA STREAM, MAUI, HI	1985	YES	YES	
AGANA RIVER, GU	1987	YES	NO	LACK OF SPONSOR FINANCING
MAALAEA SMALL BOAT HARBOR, MAUI, HI	1990	YES	NO	LACK OF SPONSOR FINANCING

FOOTNOTES:

1/ LOST NEW START STATUS BECAUSE LOCAL COOPERATION AGREEMENT WAS NOT EXECUTED BY 30 JUNE 1986.

2/ REGAINED NEW START STATUS IN FY 1987

3/ REGAINED NEW START STATUS IN FY 1988

4/ SHEYENNE HAS TWO SEPARABLE ELEMENTS AND WAS COUNTED BY ADMIN AS TWO NEW STARTS

ORGANIZATIONAL STRUCTURE STUDY

Senator JOHNSTON. Update the Committee on the status of the study of the Corps organizational structure requested by Congress in the Conference report on the 1990 bill.

General HATCH. We have the draft criteria for evaluating alternative organizational structures under review and are in the process of developing the additional information requested in the Senate Appropriations Committee report.

Senator JOHNSTON. What issues are you addressing and what is your schedule for completing the study.

General HATCH. The primary issues we will be addressing include our backlogged and projected future workload; the relationship among workload, personnel, and overhead rates; efficiency factors; constraints on organizational change; and a process for implementation. I anticipate completing the study in late August 1990. We will report to the appropriate Congressional oversight committees at that time.

POLICY AND PROCEDURE OPTIONS FOR THE O&M PROGRAM

Senator JOHNSTON. The budget request includes funds to study policy and procedure options for the O&M program. Why is this study being proposed? How is it different from the study requested in the 1990 report?

General HATCH. There are important differences between the O&M study set forth in the Senate Report and the O&M study which we are initiating. We are making a commitment, for example, to a multi-year effort whereas the Senate Report directed a 12 month study. The experiences of a year ago taught us that a single budget cycle does not afford sufficient opportunity to responsibly address the many issues surrounding the Corps O&M program. Thus, the study of Corps organizational structure is proceeding ahead of, and will not be disadvantaged in any way by, our O&M study.

The organization and focus of our O&M study are quite different from that of the Senate Report study. We have delineated five broad themes or categories to guide the study and we are placing emphasis on policy and procedure options to be used in budget formulation. And, finally, we have determined that use of an outside contractor to investigate options for all five O&M study themes will be beneficial whereas, I believe, the Senate Report anticipated an in-house study performed by the Corps.

It is because I wish members of the Subcommittee to understand what we intend to accomplish by means of our O&M study that I requested, in my opening statement, to include the O&M Plan of Study in the record of these hearings.

MAINTENANCE DREDGING FUNDING

Senator JOHNSTON. A year or so ago, the Corps experienced a shortfall in O&M funds that caused some maintenance dredging projects to be delayed. What was the cause of that shortfall and what areas were impacted the most?

General HATCH. Mr. Chairman, you are probably referring to the temporary shortages of O&M funds which were caused by several factors in Fiscal Year 1989. We initiated an aggressive management strategy which reduced unexpended carryovers from $103 million in Fiscal Year 1988 to only $45 million in Fiscal Year 1989. Unfortunately, we experienced a cash flow situation which resulted, in part, from a combination of this management strategy, unanticipated additional requirements and a reduced rate of savings and slippages. As a result, we were forced to delay some lower priority work on a nationwide basis and in all functional categories in order to accommodate the more critical maintenance requirements.

Senator JOHNSTON. What has the Corps done to correct the problem so a similar occurrence does not happen?

General HATCH. This fiscal year we have taken several measures to better cope with the volatility of variations in Civil Works O&M needs. The Director of Civil Works established a task force of field and headquarters staff to review the situation and evaluate alternative ways to more effectively manage program execution. Their recommendations included a more conservative management philosophy, more uniform procedures, improved understanding of responsibilities among management levels and functional areas, and better definitions of funding criteria for prioritizing work. I am sure that this subcommittee can appreciate the many problems associated with managing very finite resources under the unpredictable conditions which characterize the O&M of water resources projects. However, I am confident that a well disciplined implementation of our task force recommendations will help to reduce the probability of another funding shortfall similar to the one experienced in Fiscal Year 1989. In addition, we expect that the Policy and Procedure Options study, that we discussed earlier, will help us to find ways to achieve even greater efficiencies in the management of the program.

Senator JOHNSTON. When a situation like this happens, what procedures does the Corps follow to reduce the impact to any one activity? Is it true that whenever there are reductions in the O&M program due to budgetary constraints, the Corps takes the cuts out of that portion of the maintenance dredging program that is to be performed by industry? Please explain.

General HATCH. Mr. Chairman, perhaps I should emphasize that the so-called shortfall applied only to requirements which developed subsequent to our budget request. We accomplished all work which: was included in the Conference Report, still needed to be done, and had no problems with design, local cooperation, or construction administration. Once O&M funds are appropriated, we give first priority to work specifically funded by the Congress, then we address new requirements in a logical order. If there is not enough money to cover all of the new requirements for navigation, flood control, and multiple purpose projects, we must delay or forgo some of the less critical work. Priorities are based on considerations of safety and economic justification rather than on who would be doing the work. So, to answer your question more to the point, we do not single out the dredging industry to absorb a disproportionate share of reductions in available funds.

EARMARKING FUNDS FOR MAINTENANCE DREDGING

Senator JOHNSTON. The dredging industry is proposing that maintenance dredging funding be earmarked, with certain reprogramming flexibility, as a result of recent reductions in budgeted dredging activities. What is the nature of their concern and what is your reaction to such a proposal.

General HATCH. The industry is concerned that funds which are budgeted and appropriated for dredging work are being diverted to other O&M functional areas during the year, leaving a shortage of funds for dredging work. I should start by pointing out that we do not revoke funds from any project unless they are clearly surplus to that project. Typically, surpluses occur because maintenance requirements did not materialize as anticipated, favorable bids were received, local cooperation or design problems delayed award, or contractor's earnings were less than estimated. Shifts in workload necessitate moving such surplus O&M funds to those functional areas which need them the most -- whether for navigation, flood control or hydropower. Nevertheless, we want a healthy dredging industry to maintain competitive prices, so, we have been listening to the dredging industry's concerns and have reviewed the record with the conclusion that adequate navigation channel dimensions are being maintained with little or no complaints from the project users.

Industry's proposal to earmark funds with "certain reprogramming flexibility" is a contradiction in terms since any earmarking of funds, by definition, reduces our flexibility to carry out our O&M mission. A specific allocation for dredging, or for any of the other many critical O&M activities would jeopardize our ability to adjust to continuously changing conditions. In fact, specific appropriations for dredging could put the industry at a disadvantage by limiting available funds, if the actual requirements turned out to be greater than those estimated at the time of the budget request.

EMERGENCY DREDGING FUNDING AUTHORITY

Senator JOHNSTON. They have also proposed that emergency dredging to restore authorized project depths be authorized as part of the Corps' Emergency Fund authorities. What are your views on this?

General HATCH. Mr. Chairman, we do not need any additional authority to operate and maintain navigation projects in the event of any catastrophe, whether natural or man-made. That authority is contained in the Corps basic O&M authority inherent in each Federal navigation project. I understand that the proposal would expand our PL 84-99 authority to use the Flood Control and Coastal Emergencies appropriation for navigation dredging activities. The procedures for providing assistance under this appropriation are markedly different than those for the O&M program. Thus, two funding sources and two authorities would tend to confuse and delay the administration and management of any emergency dredging work that may be needed.

CORPS MINIMUM FLEET

Senator JOHNSTON. Industry also proposes that the Corps minimum fleet be reduced to equalize the effect of budgetary constraints which are currently absorbed by industry.

General HATCH. The minimum fleet was established under PL 95-269 for the purpose of meeting emergency and national defense dredging requirements and budgetary constraint management was not part of the original legislation.

Senator JOHNSTON. What is the size of the Corps minimum fleet and what is the policy which governs the operation of the fleet?

General HATCH. The minimum fleet is currently 4 hopper dredges, 3 dustpan dredges, 2 sidecaster dredges, and 1 self-propelled cutter suction dredge. In addition to these minimum fleet dredges the Corps still operates 1 sidecaster dredge and 1 special purpose dredge. The Secretary of the Army acting through the Chief of Engineers is authorized to exempt from advertisement any amount of work as he determines reasonably necessary to keep the Minimum Fleet fully operational. After consideration of historical operating records, current manning regulations, and maintenance requirements of the dredges, a 230 day operating season was established as a target. Currently the policy is to operate at no more than 230 days on a three year average, which permits the operation of more than 230 days in any one year to meet emergency dredging requirements. Many of the dredges are not operated at near the 230 day limit because their use is restricted by river stage and seasonal weather conditions.

Senator JOHNSTON. What are your views on this proposal and what impact would this have on the Corps civil and military missions?

General HATCH. The Corps of Engineers Minimum Fleet was not sized to reflect the dollars available for dredging, it was sized on emergency and national defense needs and these needs are not affected in the short run by budgetary constraints. We are beginning a restudy of the minimum fleet to determine if the current size is correct to carry out emergency and national defense work or needs to be adjusted. This restudy should be completed by the end of Fiscal Year 1991. After the study is completed, any plan to adjust the Minimum Fleet will be fully coordinated with the dredging industry and other interested Federal Agencies.

MONONGAHELA RIVER LOCKS AND DAMS 2, 3, AND 4

Senator **SPECTER**. At the outset, I want to compliment the Corps for the outstanding work it does, year in and year out, and for the cooperation which has been extended to so many Pennsylvania projects, and to me. Whenever we call, you are there. It is a great professional organization.

I want to discuss with you very briefly Monongahela River locks and dams 2, 3, and 4, located just south of Pittsburgh. The feasibility analysis for their future replacement is in its final stages. As you know, the conditions of those locks and dams are very serious and deteriorating. But, these facilities are very important to water travel and the economy of western Pennsylvania—Pittsburgh, and far beyond, and I would like to inquire as to the capability of the Corps to advance the construction of their replacements.

Mr. **PAGE**. Yes, sir; Senator, we are looking up the capability now. I think you have got it here. Do you want to speak to this?

Mr. **CLUFF**. Yes; the amount in our budget, sir, is $900,000, and that is our total requirement at this time.

Senator **SPECTER**. Say again?

Mr. **CLUFF**. $900,000, and that is our total requirement right now.

Senator **SPECTER**. Will that do the job fully?

Mr. **CLUFF**. Yes; it will, sir, for this year.

Senator **SPECTER**. What happens if you find a little cost overrun?

Mr. **CLUFF**. We will reprogram to cover cost overruns, sir.

Senator **SPECTER**. Well, that is a good assurance—enough money to do it.

Mr. **CLUFF**. Yes, sir; for this year.

Senator **SPECTER**. For this year. All right. I will stop while I am ahead on that one. That is one of the things they do not teach in law school—when to stop questioning.

DELAWARE RIVER, PHILADELPHIA TO THE SEA

I would like to discuss with you, for a moment or two, the Delaware River comprehensive navigation study and also the dredging from Philadelphia to the sea. Particularly, I wish to raise with you the consideration on the Corps' proposal to decrease funding for these items, considering their great importance to navigation there.

General **KELLY**. Sir, I am unaware that funds were deleted or partially deleted from that. We will have to look at that and supply that information for the record, if we could.

Senator **SPECTER**. Well, all right. I had been told that the Corps budget proposes a decrease in funding for the Philadelphia to the sea project and for the ongoing comprehensive navigation study on the Delaware River. Preliminarily, I am glad to hear that you have not heard about this reduction. Maybe that is bad information. I would rather have bad information than decreased funding. But, if you would take a look at that, I would appreciate it.

General **KELLY**. Yes, sir.

MAGLEV RESEARCH PROGRAM

Senator **Specter**. The third item that I want to raise with you is Maglev. You are involved on a joint study, and I would like to know what your perspective is on that.

General **Kelly**. Yes, sir; I will be happy to give mine. The Corps and Federal Railroad Administration are partners in this. In fact, as of this hour, we have underway a 2-day industry forum which started yesterday. We, the Department of Transportation, and Department of Energy are sponsoring this to create interest and see how industry might like to play in the Maglev program.

We have $1 million this year and $3.5 million in our budget for next year. The Federal Railroad Administration has about $6.2 million for next year. So, between us, we have about $10 million.

Senator **Specter**. Jurisdictionally, how does the Corps figure in there? I am glad to see you there, but jurisdictionally, where do you stand?

General **Kelly**. We were originally asked by Senator Moynihan to work with DOT in developing a Maglev initiative. We did initial planning and coordination under existing authority, but, to continue into detailed research and development, we will need specific authorization.

General **Hatch**. Sir, I would like to go on just a little bit further. The jurisdictional roles might appear to be a bit confusing. As soon as we received that task from the Congress, we began a partnership relationship with the Department of Transportation to ensure proper coordination with them. This was to help them synchronize their efforts with steel wheel high-speed rail and ours with Maglev so that the result of our efforts would be an array of recommendations on the most promising solutions for transportation in the United States.

Senator **Specter**. Well, I am glad to see you in the field. This whole endeavor of high-speed transit, Maglev, is something that we need to do a lot more of. I found several years ago that it was possible to run a train from Philadelphia to Pittsburgh in 2 hours and 8 minutes, with intermediate stops in Lancaster, Harrisburg, State College, Altoona, Johnstown, McKeesport, and, then, the final destination, Pittsburgh. That seemed to me to be really wondrous, considering the fact that it took an hour to fly from Philadelphia to Pittsburgh, an hour to get to the airport each way, and half an hour to get in and out of the plane at each end. But, that was just something that really needed to be done—obviously, not only in Pennsylvania, but across the country. We have done wonders in America, but not lately. We are doing wonders in outer space now, but we need some additional infrastructure support.

I want to compliment you on moving into the field, and urge you to do everything you can. I believe that, when you finish your research and present a program, you will get tremendous support in the Congress and from the American people, once what Maglev and high-speed transportation can do starts to sink in.

Mr. **Page**. Very encouraging, Senator.

Senator **Specter**. Well, I think you will get a lot of support.

Mr. **Page**. A statement was made yesterday which I think you will enjoy; we did. This particular individual said a lot of money is going into space, but, I do not want to go to space; I want to go to New York.

DELAWARE RIVER PROJECTS

Senator SPECTER. After you solve that, we will ask you to solve the V-22 Osprey problem so we can go to New York. Well, the hour is late. I appreciate your staying and, if you can get back to me on the specifics on the Philadelphia situation, I would appreciate it.

General KELLY. Yes, sir; we will.

COMPREHENSIVE NAVIGATION STUDY

Mr. CLUFF. Sir, I can give you a partial answer on the Delaware River project. We budgeted $100,000 for the main part of that study and that is all we need right now.

Senator SPECTER. So you are in a position to assure me that the feasibility study is adequately funded?

Mr. CLUFF. Yes, sir; we did not budget for the ongoing Delaware River main stem channel interim study for 1991 because we have enough money to complete it. That project, assuming the feasibility report is favorable, would go into PED, for which we would have a capability of $1 million.

PHILADELPHIA TO THE SEA PROJECT

Senator SPECTER. How about the Delaware River Philadelphia to the sea project?

Mr. CLUFF. That is in the budget, too.

Senator SPECTER. Well, that is different from the comprehensive navigation study, is it not?

Mr. CLUFF. Yes, sir.

Senator SPECTER. And what is the budget amount for that?

The figure I have on the project called Delaware River—Philadelphia to the sea, New Jersey, Pennsylvania, and Delaware, operation and maintenance is $11,410,000. According to the information provided to me by my constituents, they are looking for something in the $13 million range.

Mr. CLUFF. That is dredging money, sir. In the event that dredging there costs more than that, we will reprogram money for it. We have a hard time estimating dredging. It fluctuates every year.

Senator SPECTER. That is a good assurance. You are saying, to the extent you need more than that, you will provide it.

Mr. CLUFF. Yes.

Senator SPECTER. And the other line here, Delaware River comprehensive navigation study, New Jersey, Pennsylvania, and Delaware——

Mr. CLUFF. That was the one I was telling you about, earlier.

Senator SPECTER. And there again your assurance is that the funding is adequate.

Mr. CLUFF. Correct.

Senator SPECTER. OK. When the Corps of Engineers says that, that is that. Thank you all very much.

Mr. CLUFF. Thank you, sir.

ADDITIONAL QUESTIONS FOR THE RECORD

Senator SPECTER. The staff informs me that Senator Byrd and Senator Burdick have submitted questions for your response. These will be made part of the record at this time.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR BYRD

LEVISA AND TUG FORKS OF THE BIG SANDY RIVER AND UPPER CUMBERLAND RIVER, WV, AND KY

SECTION 202

Question: The FY 1991 budget request includes a total of $36,800,000 for the section 202 flood control program on the Tug and Levisa Forks of the Big Sandy and on the Upper Cumberland River. How does this request compare with the funds available for this construction program in the current year?

Answer: The Section 202 FY 1990 budget request was $25,000,000, as compared to the FY 1991 budget request of $36,800,000, which is an increase of $11,800,000. However, the FY 1990 Energy and Water Development Appropriations Act earmarked additional funds in the of amount $4,000,000 for Barbourville, KY; $17,000,000 for Harlan, KY; and $5,800,000 for Matewan, WV, for a total allocation of $51,300,000.

Question: Why does the FY 1991 budget propose such a sharp reduction; the overall 202 program is nowhere near complete, is it?

Answer: The section 202 program is not nearing completion. The FY 1991 budget request for the section 202 program actually increased by $11,800,000 over that of the of the FY 1990 budget request. The reduction between the FY 1990 Conference amount and the FY 1991 budget request is primarily due to not including the Barbourville and Harlan, KY, elements in the FY 1991 budget request.

Question: Earlier this year the director of the West Virginia Housing Development Fund, Joe Hatfield, sent a letter to me expressing strong reservations about his ability to reach an agreement to work cooperatively with the Corps of Engineers on the lower Mingo County project. Subsequently, I asked both parties to meet in Charleston with my staff last February.

It is my understanding that the West Virginia Housing Development Fund agreed just this past Monday (April 30) to enter into a draft local cooperation agreement for the development of housing relocation sites associated with the lower Mingo County project.

Both the Housing Development Fund and Corps officials at the Huntington District Office have come a long way in the last few months. I compliment them for their diligent efforts. Now the question I have is this: does the FY 1991 budget request of $36.8 million, which I noted before, contain any money for the lower Mingo County flood protection program?

Answer: No, the FY 1991 budget does not include any funds for the Lower Mingo County element in West Virginia.

Question: Why does the budget request contain no money for the lower Mingo County flood protection program?

Answer: We did not recommend initiation of any construction new starts in FY 1991. In addition, at the time the budget was being formulated, the Lower Mingo County element did not meet the eligibility criteria for a new construction start, that is, the Lower Mingo County special project report (SPR) had not been approved by the Assistant Secretary of the Army (Civil Works). The report is currently under review at the Ohio River Division. Their schedule for submiting the report for Washington level review is July 1990. Finally, the Administration continues to have serious concerns regarding these elements because they are not economic based on normal water resources development criteria applied throughout the country.

Question: Coincidently, the West Virginia Highway Department has a major construction program to extend Appalachian Highway Corridor "G" through lower Mingo County. The West Virginia Housing Development Fund assures me that substantial savings could be achieved for the Corps and for the State if the lower Mingo County flood protection project were coordinated with the Corridor "G" construction program. These savings would result from taking excess earth from the highway construction project to use as fill to elevate the lower Mingo County housing relocation sites above the flood plain. Coordination of the two projects might save several million dollars. For the record, General Hatch, would you supply the Corps' best estimate of the savings which could be achieved by coordinating the lower Mingo County project with the Corridor "G" construction program?

Answer: The Huntington District, West Virginia Housing Development Fund, and West Virginia Highway Department are working together to quantify estimated savings to the Lower Mingo County element as a result of the Corridor "G" real estate and construction effort. There are homes and businesses common to both projects, and some of the excess spoil material from the highway construction project could be utilized in the construction of relocation housing sites. Coordinating construction of the two projects could potentially reduce the Lower Mingo County element cost in the range of $5,000,000 to $8,000,000.

Question: The construction on relevant Corridor "G" segments is scheduled to begin late this summer or early this fall. Given this schedule, how will the Corps of Engineers achieve the savings which I have just discussed if there is no money in the FY 1991 budget request?

Answer: The West Virginia Housing Development Fund has taken a proactive role in the construction of the relocation housing sites and is working with the West Virginia Highway Department to achieve the full use of the excess spoil material as soon as it becomes available. The Housing Development Fund is accomplishing this effort in advance of approval of the Lower Mingo County SPR by the Assistant Secretary of the Army (Civil Works) and a decision whether or not to include this element in a future budget request. The Corridor "G" acquisition of the 50 plus structures common to both projects will reduce the Lower Mingo County project scope proportionally.

Question: What is the total estimated cost of the lower Mingo County flood protection project?

Answer: The current fully funded estimate is $128,400,000 over an optimum six year construction period. This estimate does not include the cost reduction resulting from the coordination of the Corridor "G" construction and the Lower Mingo County element.

Question: General Hatch, would you provide for the record a listing of the activities the Corps of Engineers could undertake as part of the lower Mingo County flood control program if the Congress appropriated $10, $15, or $20 million for this purpose in FY 1991?

Answer: We have no approved capability for the Lower Mingo County element in FY 1991. However, if the Lower Mingo County SPR was approved by the Assistant Secretary of the Army (Civil Works) by December 31, 1990, and Congress directed us to undertake the Lower Mingo County element, we could use $12,000,000 to undertake the following items of work:

Work Item	Amount
Engineering and Design	$ 4,000,000
Flood Proofing Construction	3,600,000
Floodplain Acquisition	3,600,000
Construction Management	800,000
Total	$12,000,000

Note: Although project and study capabilities reflect the readiness of the work for accomplishment, they are in competition for available funds and manpower Army-wide. In this context, the capability amounts shown consider each project or study by itself without reference to the rest of the program. However, it is emphasized that the total amount proposed for the Army's Civil Works program in the President's budget is the appropriate amount consistent with the Administration's assessment of National priorities for Federal investments and the objectives of avoiding large budget deficits and the serious adverse effect that Government borrowing is having on the national economy. In order to maintain these overall budgetary objectives, we could only utilize additional funds on individual projects and studies if offsetting reductions were taken.

Question: It is my understanding that the budget request includes $9,956,000 to complete land acquisition and to continue construction of the Williamson Central Business District floodwall and pump station. Do you have any additional funding capability that could expedite the completion of this project which is presently scheduled in November 1992?

Answer: No, we currently have no additional capability which would accelerate completion of the Williamson Central Business District (CBD) element. The contractor is ahead of schedule and we have previously reprogrammed additional funds to the element to pay for accelerated contractor earnings.

Question: The budget also includes $13,870,000 to continue land acquisition, planning and design for the Matewan flood control project. Similarly, could the scheduled completion date of April 1996 be accelerated by the appropriation of additional funds for the Matewan project?

Answer: No, engineering and design and real estate acquisition are on schedule. The FY 1991 budget request maintains the optimum schedule for this element.

Question: General Hatch, you have indicated that you have no additional funding capability for Williamson and Matewan; however, if during the year it becomes apparent that work at these two sites could be accelerated with additional funds, may I have your commitment that the Corps will reallocate funds in these areas?

Answer: The Administration has committed to going ahead with the West Williamson, Williamson CBD, and Matewan elements of the Section 202 project. In this respect, we have reprogrammed additional funds in FY 1988, FY 1989, and FY 1990 to the Williamson elements specifically for accelerated contractor earnings. We will continue to reprogram additional funds to these elements as the need arises and as funds are available.

WINFIELD LOCKS AND DAM, WV

Question: The fiscal year 1991 budget requests $16,200,000 to continue construction of a new lock chamber at the Winfield Locks and Dam on the Kanawha River. I am looking forward to the ground breaking ceremony at Winfield this Saturday. But before I go there I want to be sure that we will be doing everything possible to expedite the construction of this very important project. General Hatch, does the Corps of Engineers have any additional funding capability beyond the FY 1991 budget request of $16,200,000 for the Winfield project?

Answer: No, we have no additional capability for the Winfield Locks and Dam project in West Virginia. We recently awarded the Phase 1 contract and the contractor is just starting to mobilize now. The contract is scheduled for completion in late calendar year 1991. Our budget request maintains our optimum schedule for the project.

Question: What is the average time for a barge tow operation to pass through the Winfield Locks at the present time and how much of that time is actually due to waiting in line for other tows to pass?

Answer: The average time for a barge tow to pass through the Winfield locks in 1989 was 8.5 hours, of which 5.6 hours was waiting and 2.9 hours locking time. In April 1990, the total time to process through was 6.0 hours, of which 3.3 hours was waiting time, a decrease because some towing companies are utilizing their own helper boats.

Question: Would this time be reduced significantly with the new Lock chamber?

Answer: Yes, lost time will be significantly reduced. The new lock will be large enough to lock through 9 jumbo barges plus a towboat or 12 standard barges plus a towboat at one time. Locking time will be approximately 30 minutes.

Question: What can be done in the meantime to reduce the long waiting period?

Answer: Preliminary results from a traffic study report being accomplished for the Corps indicate that using helper boats to extract barges and switch boats to assist in moving barges through the lock chamber would save over 22 minutes of total locking time based on a tow of 5 jumbos barges plus a towboat. However, current Corps policy restricts the provision of Government helper boats unless a safety hazard exists.

Question: How much would the deployment of "helper boats" cost in FY 1990 and how much time would these boats save for the average tow?

Answer: The cost in FY 1990 (June through September) for the use of two helper/switch boats would be approximately $1,000,000 based on a rental cost of $178 per hour per boat. This would save over 22 minutes in total locking time, for each tow.

CHARLESTON RIVERFRONT, WV

Question: The Charleston Riverfront project has been in the planning stage for about two years. To date $500,000 has been appropriated for planning, engineering and design. What is the current estimate of the Federal cost-share to complete the construction of this project as originally planned?

Answer: The current estimated cost of the Federal share to complete the Charleston Riverfront Park project is $3,500,000.

PETERSBURG AND MOOREFIELD FLOOD PROTECTION PROJECTS

Question: What is the status of the Petersburg flood protection project?

Answer: The Division Engineer's Notice for the Petersburg feasibility report was issued in February 1990, and preconstruction engineering and design started in March.

Question: What is the status of the Moorefield flood protection project?

Answer: The Division Engineer's Notice for the Moorefield feasibility report was issued in April 1990 and preconstruction engineering and design started in May 1990.

Question: I would like to ask you, Mr. Page and you, General Hatch, whether there is any reason that both the Petersburg and Moorefield projects might not be approved by this June?

Answer: Both projects will be discussed at the June meeting of the Board of Engineers of Rivers and Harbors. Board action may not be completed immediately, however. For the Moorefield project, the 90-day State and Agency Review will not be completed by the end of June.

Question: Now, assuming that the reports are approved before the start of Fiscal Year 1991, would an appropriation of $1 million, or so, for each project be adequate to fully fund their initial construction requirement?

Answer: Both projects have several years of design work ahead of them. This work is presently budgeted for FY 1991 in the amount of $600 thousand for Petersburg and $400 thousand for Moorefield. Preparation of both project management plans and detailed cost estimates for these projects are the first design work to be undertaken. After review and approval of the project management plans, we should be able to tell you if we have the capability to use additional design funds.

QUESTION SUBMITTED BY SENATOR BURDICK

RECREATION

Question. In its November 14 letter, the South Atlantic Division stated that the Corps is required to treat recreation as a project purpose equivalent to uses such as hydropower generation which (1) were specifically named as project purposes in the authorization legislation; (2) were relied upon in the cost-benefit analysis which provided the economic justification for the project; and (3) received an allocation of project costs commensurate with its expected share of benefits. Gen. Bunker asserted this authority under the Flood Control Act of 1944, and stated that the absence of an allocation of costs to recreation, water supply and water quality does not imply that these purposes must be regarded as inferior to hydropower generation.

(a) Please explain in detail whether you agree that the Flood Control Act of 1944 requires recreation to be considered on an equal footing with hydropower, citing specific statutory language, case law and regulations.

(b) If you agree, how do you reconcile this position with the following Corps policy:

> Many projects, including those for which recreation facilities may have been included under the general provisions of the Flood Control Act of 1944, as amended, do not have separable storage costs for recreation. While under these circumstances recreation is an authorized purpose, it is secondary to project functions for which storage was formulated. Any reallocation of reservoir storage that would have a significant effect on authorized purposes or that would involve major structural or operational changes requires Congressional approval. Costs reallocated to recreation will be established as the highest of the benefits or revenues foregone, replacement costs, or the updated costs of the storage, will be treated as a separable cost, and will be subject to non-Federal cost sharing. (ER 1105-2-100) & (EP 1165-2-1) 15 Feb 1989, p. 17-4. (Emphasis added.)

(c) If your answer to Question 1(b) is that the Corps' treatment of recreation as a project purpose equivalent to hydropower does not significantly affect hydropower and therefore is not inconsistent with these guidelines, please explain why the $63 million annual impact calculated by the Southeastern Power Administration to result from implementation of the Apalachicola-Chattahoochee-Flint water management plan and the Savannah River drought management plan is not significant.

Answer. Section 4 of the Flood Control Act of 1944, as amended, clearly provides the authority to consider and include outdoor recreation as a purpose at Corps of Engineers water resources projects. Section 4 affords the Corps discretion to operate reservoir projects for outdoor recreation as well as to construct outdoor recreation facilities at those reservoirs. However, as General Bunker recognized in his letter of November 14, 1989, should the exercise of this discretion lead to a decision to operate permanently for recreation in a manner which significantly and adversely impacts other purposes, a reallocation of storage space to reflect this decision would be required. Therefore, where no storage space is allocated to recreation, recreation is an authorized project purpose under

Section 4 of the Flood Control Act of 1944, but operations for the recreation purpose are necessarily constrained by the other authorized purposes for which project storage has been allocated. We see no inconsistency between General Bunker's position and the policy quoted in the question. Both the policy and General Bunker's letter simply indicate that we have an authority to operate for recreation, and that if recreational considerations significantly and adversely impact the storage allocated for other project purposes, a reallocation of storage is needed in addition to legislation to implement the change. The operations during the recent drought in the Southeast did not have the objective of favoring recreation to the detriment of hydropower. In view of the severe drought conditions and uncertainty about the duration of the drought, a decision was made to conserve water for the long term benefit of all project purposes including hydropower. Similar water conservation measures have been taken in operation of the Missouri River Basin projects.

With regard to hydropower losses with implementation of drought management plans, we do not know the basis of the $63 million annual impact on hydropower due to the implementation of the Apalachicola-Chattahoochee-Flint (ACF) water management plan and the Savannah River drought management plan. The current water management plans for these basins differ very little from the actual operations during the drought beginning in 1985. We have been advised that during the four year period from 1986 through 1989 the Southeastern Power Administration spent $25.3 million for replacement energy to meet their contract commitments for the Georgia-Alabama power system. While this includes more projects than those in the ACF and Savannah basins, this is an annual power impact of $6 million during the most severe drought of record in these basins. The assumption apparent in the question is that drought management plans favor recreation to the detriment of hydropower. This is not correct. The drought management plans that are being developed recognize the reality that "normal" operations are not possible during periods of drought and would not benefit any project purpose in the long run. Therefore, drought management plans have been formulated which consider all project purposes in conserving the available water resources to meet the most critical public needs. If there is any project purpose which is given preference in making decisions on operating procedures during drought, it is water supply, recognizing that the protection of a viable water supply source is vital to the health and safety of the public.

Question. With respect to the Missouri River Basin, General Hatch describes the operational plan in effect for that system. He states that in accordance with operating guidelines developed by the states within the system, recreation is accorded the lowest priority among the project purposes considered in operation.

(a). Please explain why the Flood Control Act of 1944 does not require the Omaha District Engineer to treat recreation on an equal footing with hydropower in the Missouri River Basin, as it does in the South Atlantic Division;

(b). If your answer is that the priority of recreation under the Flood Control Act of 1944 has been modified with respect to the Missouri River Basin by an interstate agreement on operation, please explain how such an agreement, not ratified by Congress under the Compact Clause of the Constitution, U.S. Const., art. I, sec. 10, cl. 3, can override Federal statutory law;

(c). If your answer is that the Corps has discretion to determine the priority of project uses in different Corps districts necessary to achieve maximum public benefits, please explain how and why the Corps, in its management decisions, rather than the Congress, in authorizing projects and supervising their operation, has been vested with this authority.

Answer. The Flood Control Act of 1944 provides authority to operate our projects for recreational purposes and the exercise of that authority involves considerable discretion on the part of the Corps of Engineers. The Flood Control Act of 1944 does not require that recreation be given an "equal footing" with hydropower. Operation of projects for recreation is necessarily constrained by consideration of other authorized purposes particularly in those cases where recreation was not specifically considered in formulating the storage requirements for the projects at the time the project was authorized. There is no inconsistency in the concept that recreation has the status of a full project purpose but that it may have a lower priority than other project purposes particularly during emergency drought operations.

The review of the Missouri River water control plan by the basin states does not constitute modification or abrogation of Federal law. The objective of the interstate coordination is completely consistent with the Federal laws establishing the project purposes and has the goal of developing a consensus on a Federal plan of operation to implement the Congressionally authorized project purposes. There is no further action required by Congress to ratify or implement the operating plan.

With respect to the Corps authority to operate projects, Congress has granted the Corps broad discretion in project operations. This can be seen in statutes such as the 1944 Flood Control Act, which includes a broad recreation authority. The legislative history of this Act noted that the Congressional intent was to make beneficial uses of what would otherwise be flood waters, and was trying to do "the greatest good to the greatest number of people." Project authorizations also contain considerable discretionary authority. In authorizing projects for specific purposes, Congress establishes broad goals and objectives for project operations. The accomplishment of these goals necessarily involves considerable discretionary authority. Congress does not micro-manage water resources projects or establish priorities in emergency drought situations where all project purposes cannot be fully met. The exercise of Corps discretion in implementing and operating projects is inherent in carrying out the broad Congressional mandates contained in project authorizations and is the only practical way to accomplish day-to-day and long term project operations. The Corps exercises this discretionary authority in its Executive capacity and Congress exercises a broad oversight role.

Question. In his letter of October 23, 1989, Gen. Hatch stated with respect to the Missouri River Basin, that the Missouri River Basin management plan was based upon " the economics of the formulation of the reservoir system"; and the plan is "predicated on providing benefit, as envisioned in the authorizing legislation, to all authorized purposes." Letter, p.2. Please explain whether and how Gen. Hatch's description of the role of authorizing legislation and the economic justification for project construction with respect to the Missouri River Basin, is consistent with the statement in Gen. Bunker's letter of November 14, 1989, that "Congress has authorized purposes not specifically addressed in the economic justification of these projects," and

> **Congress has not, in our view, dictated a hierarchy of project purposes. Rather it has vested considerable discretion in the Secretary of the Army and the Chief of Engineers to operate the Corps water resources development projects to achieve the greatest public benefits consistent with broad Congressional authorization. Inherent in this is a responsibility to adjust operating methods to meet changing physical conditions or public needs.**

Answer. We do not believe there is any inconsistency in the statements. We believe that the Flood Control Act of 1944 provides broad authority to operate Corps projects to benefit outdoor recreation even in cases where these recreation benefits were not recognized in the original authorization for these projects. However, operations for recreation must recognize the project purposes envisioned in the authorizing legislation and the economic benefits envisioned at the time of authorization. As recognized in General Bunker's letter, if a decision is made to operate permanently for recreation in a manner which significantly and adversely impacts other purposes, a reallocation of project storage cost to reflect this decision would be required in addition to legislation authorizing the operational change.

CONCLUSION OF HEARINGS

Senator SPECTER. This will conclude the hearing, and the subcommittee will stand in recess subject to the call of the Chair.

[Whereupon, at 3:17 p.m., Thursday, May 3, the hearings were concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

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